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THE WORLD OF TO-DAY

THE WORLD OF TO-DAY

E. N. Fawcett, M.A.
and
M. le S. Kitchin

FIAT LUX

COLLINS
LONDON AND GLASGOW

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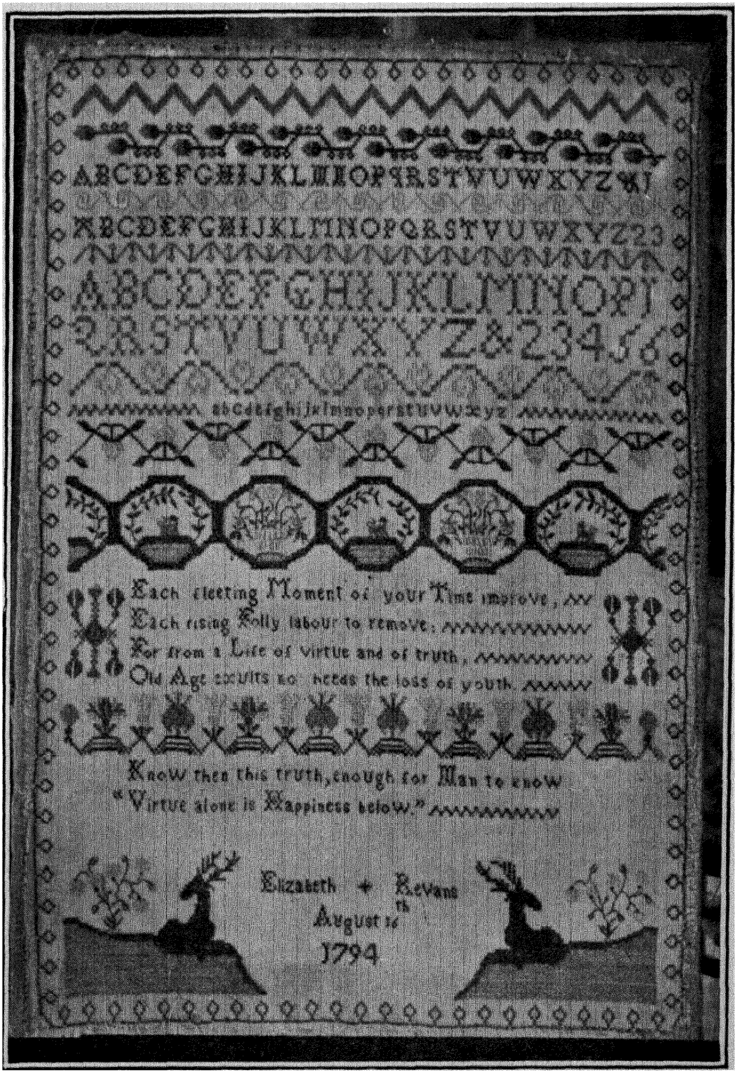
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Each fleeting Moment of your Time improve,
Each rising Folly labour to remove:
For from a Life of Virtue and of truth,
Old Age exults nor heeds the loss of youth.
Know then this truth, enough for Man to know
"Virtue alone is Happiness below."
Elizabeth + Revans
August 16th
1794

[From specimen in the Victoria and Albert Museum.

A Sampler worked in 1794.

PART I

CHAPTER I

The Good Old Days

The England of Defoe

§ 1

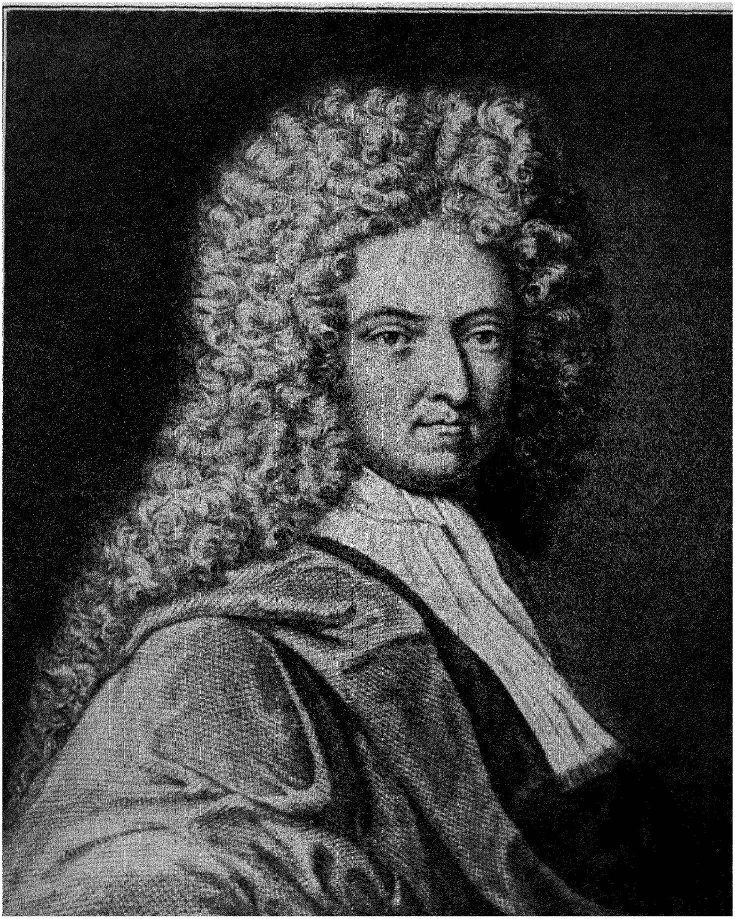
Daniel Defoe, the man who wrote *Robinson Crusoe*, travelled over the length and breadth of England early in the eighteenth century, while George the First was still on the throne. He travelled with a deliberate purpose ; to find out in detail what kind of country he lived in, and to be able to tell other Englishmen about parts of their home of which they did not know. So wherever he went he looked about him, and wrote down what he saw.

Every one who has read *Robinson Crusoe* will know how fit a man Daniel Defoe was for the work he had set himself. That story of a shipwrecked sailor on a desert island, of his coming ashore, of his clever methods of finding food and clothes, of how he builds his hut and his boat, of the shock of his discovery that he is not alone on his island—owes its force and its charm to Defoe's power of grasping the importance of practical things, and to an eye for detail that a scout might envy.

The delight in adventure which made Defoe, late in life when a man might wish for quiet and comfort, put himself in imagination in the place of a sailor fighting for life against death by drowning, death by starvation, death by the teeth of wild beasts or the hands of savages, prevented his own life being in any way humdrum or dull; but his adventures were of a different kind from those of Robinson. If he had to hide from men who sought his life, it was because Judge Jeffreys and the men who obeyed James the Second's will thought his ideas on English liberty and English religion dangerous to King James's Government, for he was a political agent of the Revolution, and King William's man. Or if he rode the highroads and bridle paths of England with pistols in his holster, it was because of the highwaymen who infested them, for to travel at all was an adventure in his days.

Daniel Defoe was amongst other things a journalist, which to-day would mean a writer for the newspapers, but in his day there were no newspapers as we think of them. Men in the country had their news from news-letters which were carried by the horsemen who delivered the mails once a week, or in remote places only once in two or three weeks. In London and the towns people had their news from broadsheets, posters stuck up on walls or hawked about the streets. Often there was a picture, and beneath it the verse of a ballad on some skirmish with the buccaneers, or case in the law-courts, or unpopular action of one of the King's ministers ; and these " Broadsheet ballads " were sung about the town to a tune which everybody knew.

It was not on broadsheets, however, that Defoe told people his views on politics: it was in political pamphlets which were sold in the streets (he was only one of a host of pamphleteers) and read in the chocolate-houses and coffee-houses. There men met to drink these



[Will F. Taylor

Daniel Defoe.

new drinks which had not yet taken the place of beer for breakfast, but were still novelties. There they discussed the news of the day, the new play, or the chances of a good harvest—an important matter then, for most of England lived on its own home-grown corn—or the wealth and success of the merchant-companies who traded to India or Panama.

It was not the London of the coffee-houses, however, that mainly interested Defoe, for there fashionable London met the fops such as Joseph Addison describes in his *Spectator*, with their changing fashions in dress, in the tying of a cravat, the cut of a coat or the new cock of a hat and the "Ramillies periwig" giving place to the French peruque. Though most of the writers of the time moved in this company, Defoe's interests only rarely overlapped with theirs; for the picture they gave of London was only of a little part of it. They lived the slightly artificial life of leisured and cultured people, the kind who gave up their solid oak Jacobean furniture for the light gilded furniture of the French salons, or began to fill their houses with carpets and screens from the East.

Defoe went below the surface of society, and inquired into the causes which made this luxury and prosperity possible. London was even two hundred years ago one of the greatest trading-centres in the world; and Defoe tells us of its port: "The part of the river which is properly the harbour, and where the ships usually deliver or unload their cargoes is called the Pool. It begins at the turning of the river out of Limehouse Reach, and extends to the Custom-House-Keys (Quays). In this compass I have had the curiosity to count the ships as well as I could, *en passant*, and have found about two thousand sail of all sorts, not reckoning barges, lighters or pleasure-boats, and yachts, but of vessels that really go to sea."

These were merchantmen for the most part ; but he was impressed also with the men-of-war in the docks, and with the naval stores. For Defoe realised that it is upon her trade and her shipping that England's strength and wealth depends ; and on his travels the seaports of England had a special interest for him. Of the harbour of Bristol, " the second greatest trading city in England," he writes: " The key along the river is very noble and well filled with all sorts of merchandise; and a handsome row of houses fronts it. It is much beyond that of the custom-house at London "—in appearance he means. But the trade of the city he noticed was larger than its " narrow streets and buildings will allow." " The Tolsey or Change where their merchants meet is so straightened, so crowded and in so many ways inconvenient that the merchants have been obliged to do less business there than indeed the nature of their great trade requires." He found that an Act of Parliament was passed a year or two before his visit to Bristol, to allow the merchants to buy up the old meat-market and build a new exchange ; and, always anxious for progress and improvement, he wondered why the town had not erected the new building, as it would add greatly to the beauty as well as the convenience of the city.

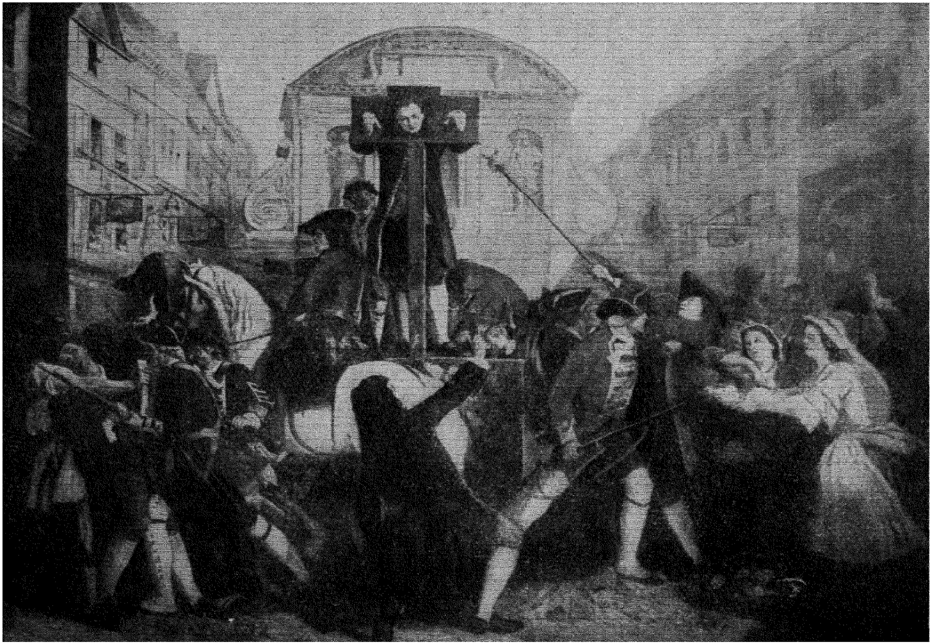
§ 2

The trade of Bristol was hundreds of years old; but Defoe was delighted with the sudden prosperity of the newer port of Liverpool : " This town is now become so great, so populous and so rich that it may be called the Bristol of this part of England." He tells of the fine new buildings, and the "noble harbour" in the Mersey; and of the "wet dock," for laying up their ships. . . . "And indeed it is the only work of that kind in England except what is in the river Thames; I mean for the merchant-service. The dock is capable of holding a hundred sail of ships."

Yarmouth, on the coast of Norfolk, is another instance of Defoe's interest in the trade and coming prosperity of England. He tells of its fishing-fair, and great trade in herrings; and counts up its other great trades. "Another part of its commerce is in the exporting of these herrings after they are cured, and for this its merchants have a great trade to Genoa, Leghorn, Naples, Messina, and Venice; and also to Spain and Portugal. Also exporting with their herrings very great quantities of worsted stuffs and stuffs made of silk and worsted. . . . Besides this they carry on a very considerable trade with Holland, whose opposite neighbours they are; and a vast quantity of woollen manufactures they export to the Dutch every year. . . . They have also a considerable trade to Norway and the Baltic, from whence they bring back deals and fir-timber, oaken plank, baulks, spars, oars, pitch, tar, hemp, flax, spruce-canvas and sailcloth, with all manner of naval stores."

Besides the lawful trade of these and many other ports, Defoe comments on the smuggling of goods without paying customs on them, which was an open secret in several parts of the country.

"As I rode along this coast" (the coast of Kent and Sussex, near Folkestone), says he, "I perceived several dragoons, riding-officers and others, armed and on horseback, riding always about as if they were huntsmen beating up their game. On inquiry I found their diligence



By Eyre Crowe] [Rischgitz

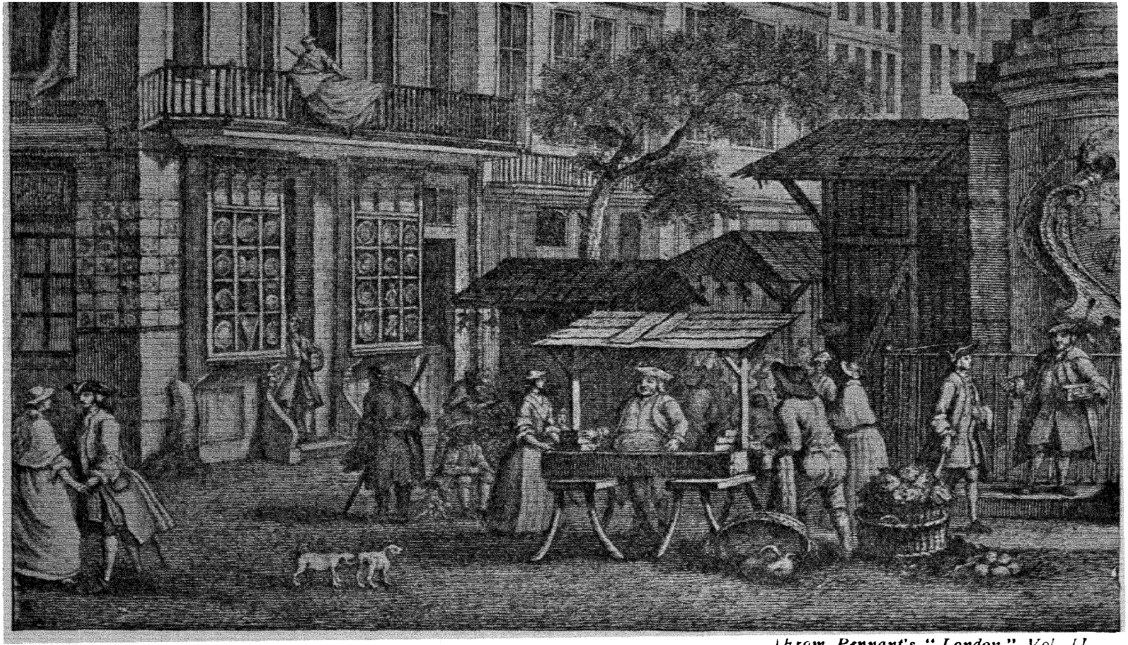
Daniel Defoe in the Pillory

He was pilloried three days, July 29, 30 and 31, 1703, as part of his punishment for writing "The Shortest Way with Dissenters."

was employed in quest of the smugglers who run goods on shore without paying duty, and of the 'Owlers' as they call them who export wool unwrought, contrary to law; and sometimes they catch some of them. But when I came to inquire further I found too, that oftentimes these officers are attacked in the night with such numbers that they dare not resist or if they do they are wounded and beaten and sometimes killed. And at other times they are obliged as it were to stand still and see the wool carried off before their faces, not daring to meddle. And the boats taking it from the very horses' backs go immediately off, and are on the coast of France before any notice can be given of them. While the others are as nimble to return with their horses to their haunts and retreats, where they are not easily found out."

London, thought Defoe and all Englishmen, was the centre of all important English trade; towards London everything moved. To London came coals from Newcastle, brought round by sea and up the Thames. For it was no easy matter to carry coals even in small weights on packhorses along the bad and rutty roads. To feed London came flocks of sheep and herds of cattle from the farming counties east and west; and geese, either driven in flocks or carried in tall three-decked waggons. So it was from London as from the centre of a wheel that Defoe set out on the journeys—circuits, as he calls them—which took him east, south-west, and north. Sometimes he went twice over the same ground, for he was a thorough observer; and he combined all his observations in his *Tour of the Whole Island of Great Britain*.

"The villages round London," he tells us—Hackney and Bromley, Highgate and Hampstead are amongst them—"are already beginning to feel the nearness of



[From Pennant's "London," Vol. II.

*Market **stall in London** in 1753. **You** can **learn much** of London street life by studying this picture.—**The man at** the stall has **books** to sell. Notice the woman spreading cloths **on** the balcony above the shop.*

the city, and to have town houses built in them" ; but as he travels farther from the great city, the face of England changes.

Defoe was constantly surprised on his journeys by what he saw. Again and again he noticed "the new stone bridges" which had taken the place of some ford or ferry-boat; the "fine new buildings" of one town, or the "prodigious quantity" of trade in another. The size of the fairs of Ipswich and Stourbridge, and the distance from which men came to them to trade; the number of carts and waggons that came to the wheat-market at Farnham from the cornfields of Surrey and Hampshire impressed him, not less than the serge market at Exeter or the Brig-market in Leeds. And he had a sense that there was growth and change, but he could hardly account for it by what he saw.

§ 3

Other things which were as they had been for hundreds of years, and which Defoe took for granted, would surprise us a good deal. On a journey north he tells us how the river Trent divides Great Britain almost into two, and implies that to the north of it one is in a difficult and rather strange country. His journey over Blackstone Edge from Lancashire into Yorkshire was only an unusually hard part of a journey where difficulties had constantly to be overcome. "It was not easy to express the consternation we were in when we came near the top, the wind blew exceedingly hard and drove the snow so directly in our faces that we could not possibly keep our eyes open to see our way; nor if we could was there any to be discovered except as we were showed it by a frightful precipice on one hand, and uneven ground on the other. Our very horses betrayed their uneasiness at it; and a poor spaniel dog who was our fellow-traveller, and who usually diverted us by giving us a mark for our gun, turned tail and cried." Peals of thunder in the snow-storm were making the travellers suggest turning back, when one of them called out that he could " see over into Yorkshire "—and that there was a plain way down on the other side. " We all rode up to him, and found it true as the fellow had said, except his discovery of a plain way. There was, indeed, the face of a road on the north side of the hill, but it was a very frightful one, narrow and deep, with a hollow precipice on the right, from whence the water descending from the hills made a wide channel at the bottom, which looked like the mouth of a river gaping to receive us. After we had gone a little way the hollow on the right appeared deeper and deeper, so that we thought it best to alight and lead our horses about a mile, though the violence of the wind and the snow continuing made it both troublesome and dangerous. . . . Turning to the left we found a brook running across our way to the north."

When they had crossed this flooded brook the travellers saw a few poor houses, and though they had to knock loudly before any one would appear, they found the cottages very crowded, as Defoe notices that many of the Yorkshire cottages were. He describes the desolateness of this part of the country, and the small villages huddling together among the hills. He observes that they grew no more corn in these parts than they needed for their own food, but that the whole district was a manufacturing country. The old meaning of the word " manufacturing " was " making by hand," and that was true of the wool-spinning and weaving in these Yorkshire

[*From a contemporary print in the V. & A. Museum, S. Kensington.*

A gay company assembled at the "Pantheon" in Oxford Street, in the later eighteenth century.

villages. There each house had a tenter with cloth stretched upon it and each family would work a hand-loom and one or two spinning-wheels in its cottage. The cloth would be taken, one roll at a time perhaps, to the market at Leeds—the greatest wool-market in the country. Not only had the grown-up people of a family their share in the making of cloth; but Defoe saw little children of four and five years old standing in dye-tubs, and treading down the wool into the dye. It did not occur to Defoe or to other people of his day that these babies ought not to be at work; nor did he wonder why those a little older were not at school, for very few of the villagers ever learnt to read or write.

The villagers had, however, wisdom and interests and enjoyments of their own. In different parts of England different sports and songs, games and dances were popular. Every countryside had its ballads which preserved the old stories of the neighbourhood. In one district of the northern midlands, perhaps, the spinners still sang how

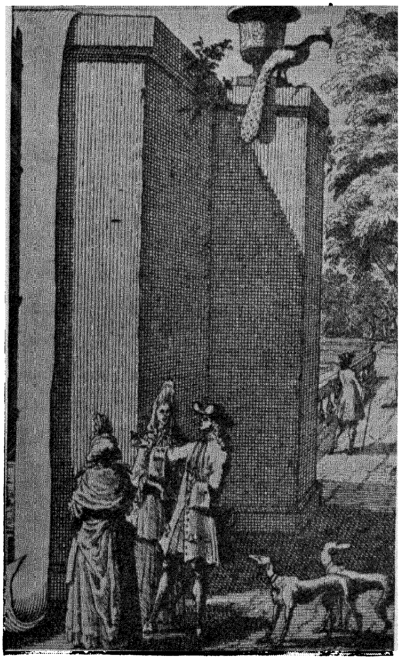
" Robin Hood to Nottingham came
With a link-a-down and a down "

to rescue the widow's three sons.

Such songs as " The Farmer's Boy," or " Mowing the Barley " show what was the work of the people who sang them. Their country-dances have names no less near to village life—" Gathering Peasecods," or " Picking up Sticks," and while Defoe was writing his book a new dance had come in, called, " Can ye weave bone-lace ? " Most of the games we play to-day were played in some form. Football had long been a favourite game in the north ; the men of Suffolk were famous for the speed of their running races ; and the men of Norfolk, and those of the west country, particularly the Cornishmen, were renowned wrestlers.

Defoe took all this so much as a matter of course that he rarely talks of any sport, though he writes of the Cornish wrestling. As a traveller, he was constantly in the saddle, and he was, as we should expect, interested in and fond of horses. Not only does he call up with a thrill of excitement the races he had watched at Newmarket and elsewhere; but also he was distressed to notice that the men of Bristol made their horses drag heavy loads about the streets on sledges instead of waggons with wheels. When Defoe was in Leicestershire he noticed the fine horses that were bred there, " The best in the country. . . . Many of them the great black dray-horses and coach-horses that are brought to London."

Leicester, he also considered, one of the best sheep and cattle-rearing districts, along with Sussex and the west country. But though he often admired the fine fat sheep and cattle of different parts of England, and the goodness of English grown wool, we should think the



[From " Les Délices de la Grand Bretagne et de l'Irlande "—James Beeverell, 1707

Costume in the days of Queen Anne.

animals he saw poor lean creatures; for farmers did not yet know how to feed their cattle in the winter ; and all the animals grazed on the common-land of the villages. Nor would Defoe, as he rode by, see or expect to see fenced fields belonging to each farmer. He saw huge open fields where many farmers had one or more strips of land each. He was not surprised to note that one in every three of these great open fields was lying fallow, with nothing in it. For every countryman then knew that if a field is ploughed one year for wheat and the next for barley, it has to lie fallow the third year if the ground is to be good for corn again.

There was still much waste land in England. Even in the neighbourhood of London there were wide heaths, such as Hounslow Heath, where coaches went in terror of highway robbers as soon as it began to grow dark. Part of Kent was still covered with forests, and it was in that country that iron was mined, because there was charcoal at hand to smelt it.

Defoe's picture of the England of the early eighteenth century, made faithfully and in detail as he travelled from county to county, is of a land of farming and home-industries, but also a land of enterprising merchants and successful commerce; and of immense public-spirit. The merchants of Liverpool were freemen of the rival port of Bristol, too, as the merchants of Bristol were freemen of Liverpool. And everywhere Defoe notices what the town has done for the merchants, or some wealthy merchant for the town where he made his fortune. Defoe, who was a patriot, though not of the boisterous kind, and who appreciated this public-spirit, noticed wherever he went, the "great free school" or grammar-school which nearly every town possessed. He saw the hospitals, almshouses and charity-schools which were all built by the generosity of a man or a town, rather than by the State with the taxpayer's money. Defoe knew his England well; her roads and her manor houses, her farms and her harbours, and the wealth and poverty of her towns. He wrote his book because he thought it the right and duty of other Englishmen to know their country as he did. But in his preface he tells us that his picture cannot long remain a true one; for England is altering every day; so that it is as hard to describe her as to make clothes to fit a growing child, or to paint a portrait of a face whose expression is for ever changing.

CHAPTER II

THE LAND CHANGES

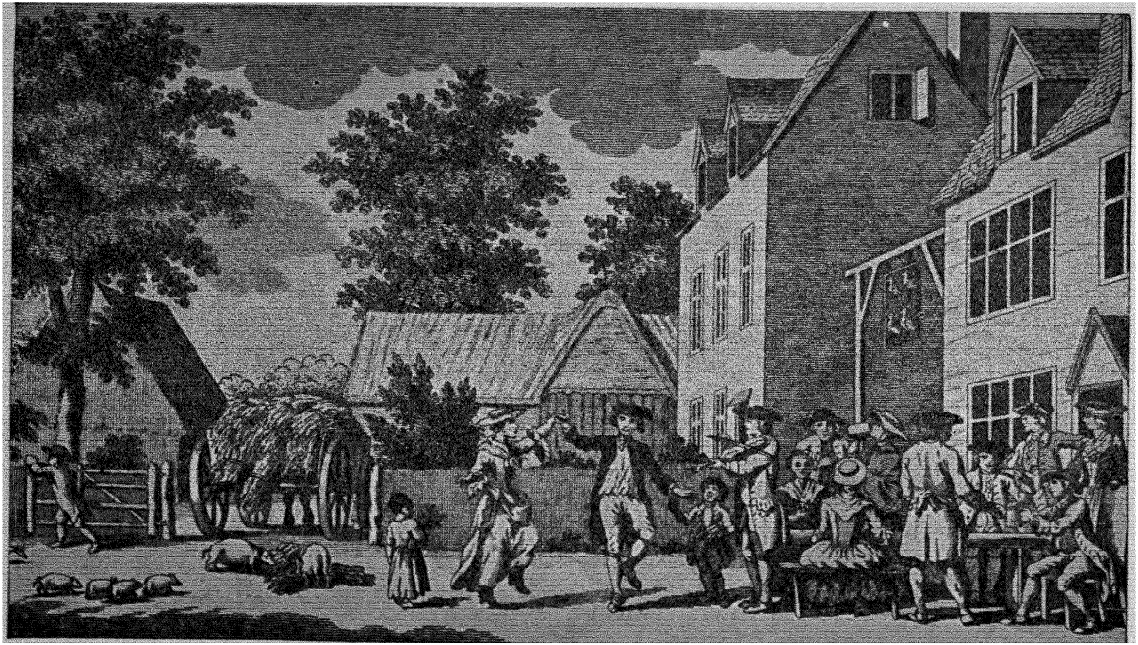
The England of Squire Coke

§ I

DEFOE was right in saying that his picture of England could not long remain a true one. He sensed changes ahead, but even he, adventurous spirit that he was, would have been startled if he could have known how very great and how very swift these changes were going to be. He wrote of his travels early in the eighteenth century. To a little boy reading them early in the nineteenth century they must have seemed almost as strange as the travels of Gulliver. For by then the face of England had altered so that Defoe would have rubbed his eyes.

The changes began on the land, which in Defoe's day was still the main source of England's wealth, for her richest trade was the wool trade, and the wheat for the weavers and spinners as well as the grass for the sheep was all grown at home.

As we have seen, the crops were grown for the most part on great open tracts of country not divided into fields, and the sheep fed on the unhedged commons. The country was farmed in part by many small yeomen farmers and cottars : those villagers (whom Defoe talks of) who worked little scattered strips of land, often



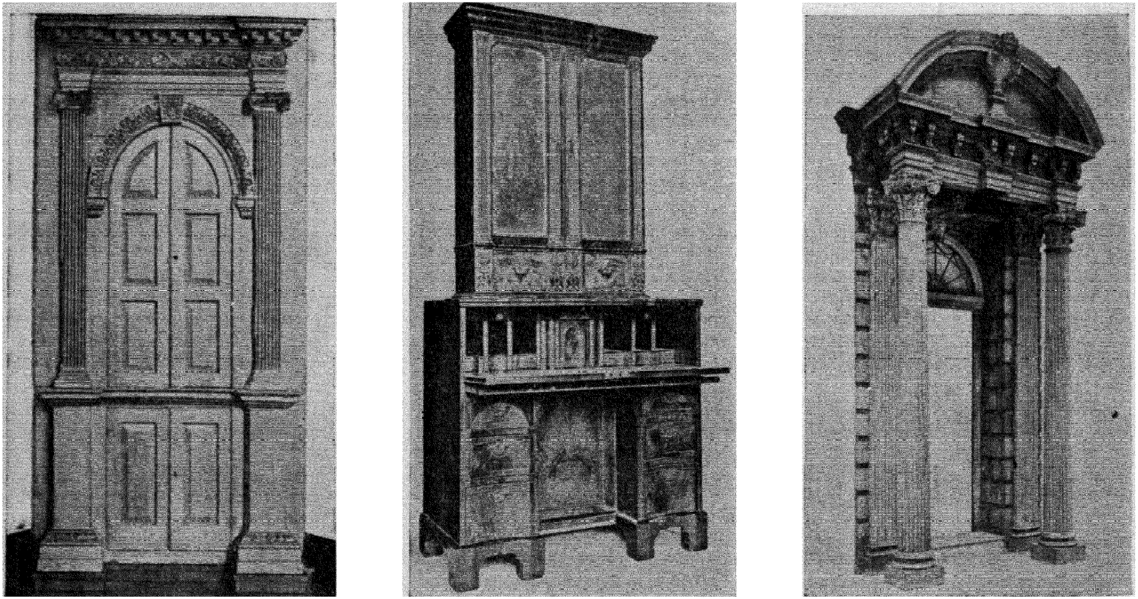
[*From a contemporary print in the V. & A. Museum, S. Kensington*

Celebrating the gathering in of the harvest—a typical English country scene of the eighteenth century. Study the farm buildings, and note the inn and sign.

growing only just enough for themselves and working in their own homes at spinning or weaving. This system made it very difficult for the farming to be good, for few of these smallholders could afford to improve their land by draining or by manuring, and many of them were both ignorant and unwilling to learn new methods.

As these farmers had their strips of cultivated land all mixed one with another, and as their sheep and cattle grazed together on fallow, meadows and waste, the enterprising man could not try new methods. If the strips of a common field were being sown with wheat, then his also had to be sown with wheat. When a large open field was fallow, no farmer could have his pieces sown with a crop for his neighbours' animals would destroy it. It was the same with sheep and cattle. If a farmer wished to improve his animals, to breed cattle to give more and richer milk, or to breed larger and fatter sheep with finer and more valuable fleeces, he must have them separated from the herds and flocks of others. To do this he must have all his land in compact pieces and not scattered in strips among those of his neighbours.

As the population of England in the eighteenth century grew at first steadily and then very rapidly, much more food had to be grown, and the old ways of farming were too inefficient. By the end of the eighteenth century or soon afterwards, most of the land of England was divided up into separate farms. The great open fields with their strips had vanished. Their place had been taken by the small fields, the hedges, and the scattered farmhouses of the England we know to-day, and so the clever and industrious farmers were free to experiment and were not kept back by dull or lazy ones. Thus, although the population of England was rapidly growing,



[*V. & A. Museum*

LEFT.—*A corner cupboard of oak, made about 1700.* CENTRE.—*A walnut writing cabinet of the Queen Anne period, said to have belonged to Dean Swift.* RIGHT.—*A doorway and porch of pine wood, built in the days of Queen Anne.*

the land provided food for the people, better food and in greater variety than at any time previously.

In the early years of the eighteenth century it was mainly the large landowners who first began to take this keen interest in farming. Even Robert Walpole, the first Prime Minister of England, who was head of the Government from 1721 to 1742, in the reigns of the first two Georges, used to open his gamekeeper's letters every morning before the most important State papers, while King George III himself was called " Farmer George," and his model farm at Windsor is still kept up.

As early as 1700 some men who owned enclosed farms had begun to experiment in the new methods.

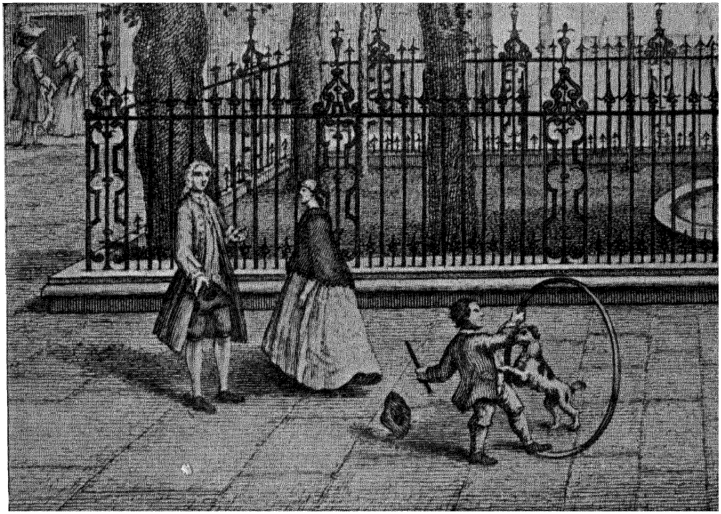
Perhaps the very first of these " reforming farmers " was Jethro Tull. He was born at Basildon, in Berkshire, in 1674, when Charles II was King. He was a clever, though delicate, boy. When he left St. John's College, Oxford, he studied law, and wished to become a politician. He had to give up this ambition through ill-health ; the doctors decided that he must live an out-door life, and so he went to Howberry Farm near Wallingford, and there began his farming experiments.

His first improvement was the drill. He saw how slow and wasteful the old method of sowing was, where the sower walked up and down the furrows with a basket full of seed hanging round his neck, and scattered it in handfuls to left and right. Like the seeds in the parable " some fell upon stony places where they had not much earth—and some fell among thorns," while those which fell on the good ground fell unevenly, often too close together, often not to the right depth.

Tull's idea was that a machine could be made which would sow more quickly and in straight, even rows from between which the weeds, which sometimes almost choked the old crops, could be cleaned out. As he did not know enough about machinery to make this entirely himself, he began to look at all the existing machines he could think of in the hope of finding something he could adapt. He found what he wanted at last in an odd place. It was by copying the groove, tongue and spring in the soundboard of an organ that he made his first drill in the year 1701. It was pulled by a horse and looked like a box hung between two large wheels, with tubes running down from the box, the open ends of which scratched little furrows in the soil and filled them with grain, while a rake fixed on behind covered them neatly over as the drill moved along.

" It makes the channels, sows the seeds into them and covers them at the same time, with great exactness and precision," was Tull's own description of his invention in a famous book he wrote later about farming, called *Horse Hoeing Husbandry.* For in cleaning out the weeds from between the rows of his crops he had discovered the great value of hoeing. It not only killed weeds, but made good crops possible in dry summers. This is because the earth is full of countless tiny tubes through which the water rises in dry weather and evaporates, that is to say, passes away into the air. The hoe breaks the top of these tubes and corks the water in, so that the roots of the plants can use all the moisture there is in the soil when none is coming to them in the form of rain.

Tull moved to a new farm near Hungerford which he called " Prosperous," but before he had succeeded in making it live up to its name he had to go abroad for the sake of his health. In the south of France he learnt a method of crushing the earth into fine soil, called pulverising, which was much used in the vineyards, and when he came back to England he experimented with success in treating wheat fields in the same way. As well as this and hoeing for dry land, he practised a method of draining for wet land. Good crops cannot be grown where there is too much water in the soil any more than where there is too little, for too much water keeps the air away from the roots. But if the water can sink through the soil it draws the air with it and the roots can drink in the right amount of moisture as well. So Tull dug narrow trenches about two feet deep, threw in loose stones or hedge clippings between which the water could trickle, and then covered them over with earth. After heavy rains much of the water drained away through these underground gutters into ditches, which in their turn led into streams.



[*From Pennant's "London," Vol. I.*

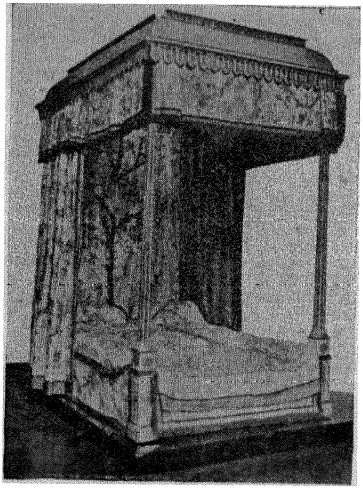
A group in London in 1753. Look carefully at the costume, and compare it with that of the earlier eighteenth century.

By these means Tull improved his land very much. He wrote several more books about it—some of them being translated into French. Thus he now taught France, just as at one time he had learnt from her in the vineyards.

§ 2

Another great man of the period also gave up politics for agriculture. This was Charles, Viscount Townshend, who earned the nickname of "Turnip" Townshend, which has stuck to this day. He was a brother-in-law of Robert Walpole, the famous minister, and during his rather stormy parliamentary career was first Walpole's helper, then his rival, and afterwards his enemy. Walpole was the abler politician, and in 1730 Townshend retired to Raynham Hall in Norfolk and began to farm. One of his first moves was to introduce the turnip from Germany, and with its help build up the method of farming known as the *rotation* of crops.

Defoe had taken it for granted that farmers should each year leave about a third of their ploughland "fallow," or unplanted, allowing the sun and weather to work on it. In his day they knew no other way of cleaning it and preventing it from becoming so poor that nothing would grow on it. Townshend, however, found that the land could be cleaned and kept rich by changing the crops grown on it every year. Instead of planting wheat over and over again in the same piece of ground he planted first turnips, then barley, then clover or rye grass, then wheat, and the fifth season began again with turnips, and so on. So fallow was no longer necessary, and all the land, instead of only two-thirds, could be planted every year.



V. & A. Museum.

The bedstead of David Garrick, the famous English actor, who lived from 1717 to 1779, now in the V. and A. Museum, S. Kensington.

He used Tull's drill for his planting and Tull's method of hoeing and weeding, but he quickly found from experience that these new ways of farming could only be used where the land was cut up into fields which separated the different crops and made the draining easier. Therefore, besides enclosing his own estates and dividing them into fields, he encouraged others to do the same. Through his efforts the Heath near Norwich was enclosed in 1760 (the year George III came to the throne), a good road was built across it, and the fields cultivated according to his plan, with the result that it gave an ample profit at a rent of 15*s.* an acre—just ten times as much as its value before the change.

Townshend was a handsome, burly, hot-tempered man, but a kind-hearted and loyal friend. It is easy to imagine him riding about his lands, shouting to his tenants, who answered the call very quickly indeed, but who loved him and laughed with him as well as fearing him, and were very sorry when he died.

Townshend's turnips had another very important effect on farming. Before they were grown in England, scarcely enough cattle for milking or ploughing could be kept during the winter, because of the difficulty of feeding them. All the rest were killed off in the autumn and the meat was salted, spiced and stored for the winter. Now it was found that cattle could be fed on turnips and mangolds through the cold months when there was not enough grass for them. So for the first time in history, most Englishmen could eat fresh meat all the year round, and milk became more plentiful.

Some of the ships Defoe counted in harbour must have come from the East Indies, with cargoes of the spices which were used in dressing the meat, to kill its harsh salt taste. Though that trade now grew smaller, the new trade in fresh meat brought more wealth to farmers and merchants, as well as more palatable food and better health to the townsfolk.

§ 3

A man to whom this change meant a great deal was Robert Bakewell, a Leicestershire cattle breeder. Bakewell was born on his father's farm at Dishley in 1725, and there, when he grew up, he began experiments to prove his idea that sheep and bullocks could be bred and fed so that they grew fat in those parts of the body which were best to eat, or, as he put it, "You can get beasts to weigh where you want them to weigh, that's in the roasting, not the boiling parts."

It was he who first bred the famous Leicestershire sheep which spread over every part of the United Kingdom, and the Leicestershire long-horned cattle, "a small, clean-boned, round, short-carcassed, kindly-looking cattle, inclined to be fat," as their breeder described them. All his experiments were based on kindness and cleanliness, and his stock was better housed and fed than any in England.

He formed the Dishley Society to spread his ideas. The members never bred from weak or inferior animals. They copied him in building comfortable airy pens and sheds, properly drained and cleaned, in flooding their grass lands to improve the summer pasturage, and in feeding their stock on root crops in winter.

By these methods sheep and cattle were so greatly improved that the average weight of the animals sold at Smithfield was doubled between 1710 and 1795.

Bakewell also bred a famous strain of black horses (descendants of those Defoe noticed) on one of which he rode about his farm, while his greatest stallion he took to London on show, where it created such a sensation that " Farmer George " asked to see it. Bakewell took the great black horse to St. James's Palace and the King came out to admire it. He kept at a safe distance, however, for the horse cared nothing for royal hands, and would not let any one come near it but its master.

A great many people went to see how the farm was run, and where these fine animals were bred, and, as there was no inn nearby, Bakewell used to make them all his guests. He would show them his stables and dairies, his beasts and land. They would be taken to the wharf to which his boats brought his grain crops, and to the " turnip trap " across the stream. This contrivance caught the turnips that were just thrown into the water from the remoter fields and floated down to save cartage.

Then he would take them indoors and show them his private " museum." This was a huge and curious collection of animal skeletons, and of pickled and stuffed specimens showing the stages in his various breeding experiments ; a collection which was unfortunately split up when, owing to the expense of his methods and his too generous hospitality, he went bankrupt in 1776.

Kneller.

Rischgitz.

Charles, Viscount Townshend.

Facing page 38.

§ 4

But those were hospitable days, for the most famous of all the new farmers, " Squire " Coke of Holkham, had no less than 7000 visitors at one of his great annual sheep-shearings ! Coke was a very different type of man from Bakewell. He was educated at Eton and began life, as the fashionable young men of his day did, with the " Grand Tour " of the Continent, making a long stay in Rome. There he was known as " the handsome Englishman," a great dandy, who probably set some of the fashions in cravats and perukes copied in the London coffee-houses. He also, so the gossips whispered, made love to the Pretender's Queen, the young wife of Bonny Prince Charlie.

When he was twenty-five, however, his father died, and he had to give up his gay, aimless life of fashion and return to England to look after his estates. Most unwillingly he entered Parliament in 1776, his borough having elected him without a contest, and there he stayed until 1833.

Some of his political adventures were exciting, as when he was attacked by a violent Anti-Corn Law mob in Norwich and only escaped through the inspiration of a butcher called Kett, who turned a bull loose on the crowd, while he hustled Coke into his shop and threw up the shutters. But, though his Parliamentary career was long and in many ways distinguished (he had twice been offered, and refused, a peerage, before he became Earl of Leicester in 1837), it is as a farmer that he is really famous.

When he inherited his estates in 1776, the Holkham district was unenclosed and miserably cultivated, and only the old bony Norfolk sheep and a few poor milking cows were kept on the estate. There were no proper roads and the fields were not drained. His tenants paid him between 1*s.* 6*d.* and 3*s.* 6*d.* an acre, and they lived and worked much as the villagers described by Defoe. As most of the landowners in that part of England charged 10*s.* an acre for their ground, Coke was acting moderately when he raised his rents to 5*s.*, but many of his tenants refused to pay it, saying they could not possibly make a living.

[*From W. H. Pyne, "Microcosm," 1803*

The cattle ferry in the early nineteenth century. It is not a very easy task to land the cattle and sheep safely.

He took over the land himself, determined to show them that it was their methods which were at fault and that a profit certainly could be made at his price. Though he had never had any training or experience in farming he was an intelligent, observant young man, and he had noticed many things in his travels on the Continent. One of them was that wheat could very well be grown on light soil if it were properly manured. Wheat had never been grown at Holkham. Every one said the soil was too poor and grew rye instead, so when Coke said he was going to grow wheat all the old stagers sat back to watch the young squire fail, and got ready to say, " I told you so." There was a surprise in store for them, however. Coke enclosed and manured and grew as good wheat as any one.

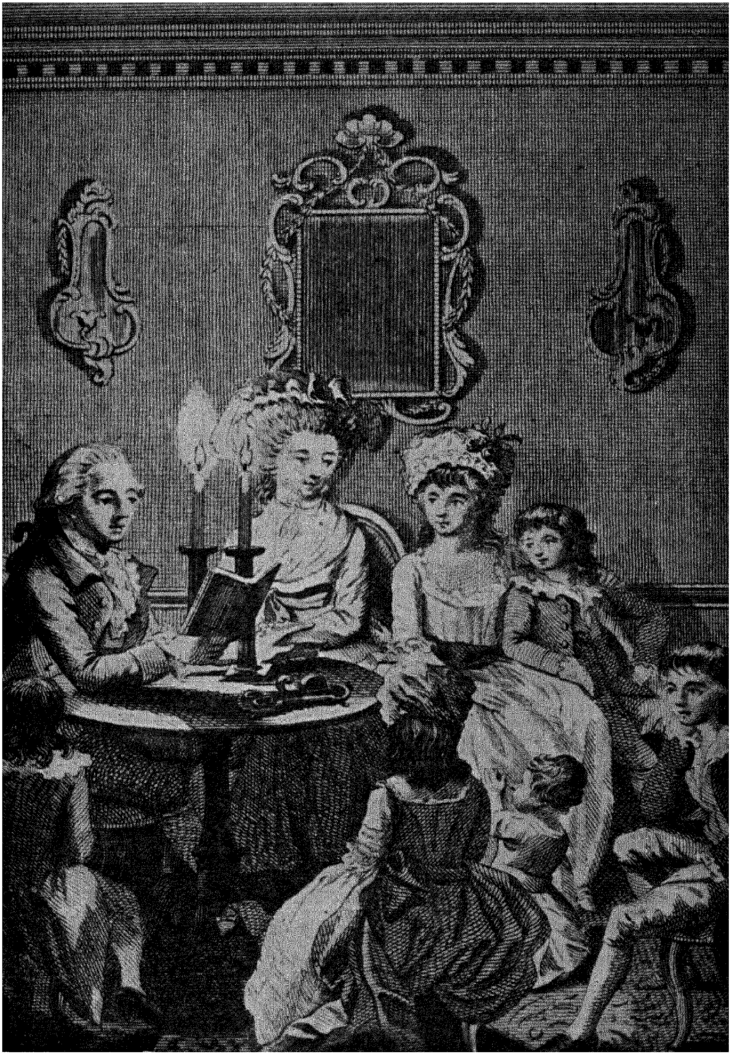
All the same, he realised that he had much to learn, He visited all the farms where the latest improvements. were practised, gave big dinner parties to breeders and grain growers, and was never above listening to sound advice. The result was that he found the best rotation of crops to suit his land, introduced hoeing and drilling, flooded or drained as the ground required, improved his ploughs so that two horses could be used instead of four or even five, and converted a flock of 800 miserable looking sheep into a flock of 2500 excellent Southdowns.

He did more. He brought cattle from Devonshire, bred pigs and poultry, and was the first man in England to realise the importance of good hay for his beasts. The method by which he succeeded in growing it was original and characteristic. He rounded up all the children on the estate, gave them simple botany lessons and sent them out to collect the seed of the best grasses. He even employed those parts of his land too hilly for tillage by planting fifty acres of trees every year until he had 3000 acres of timber, and in 1832 was able to embark in a ship built of oak from the acorns he himself had planted.

Between 1776 and 1816 he increased his rent-roll from £2200 to £20,000 a year, yet his tenants gained by his changes. They held their farms on long leases and shared in all the improvements he made, borrowing horses and machinery, copying his methods and interbreeding their stock with the home farm. The whole estate, of course, had been enclosed ; there was no alehouse on it, and the workhouse had been pulled down, because there was no one to use it.

Coke must have possessed amazing energy, for all this time he was an active member of Parliament, and was famous as one of the boldest riders to hounds and best shots in England. He married twice, and brought up a family " to a love of the land and a fear of the Lord." The land, it might be noticed, came first !

The men who had come to his dinners to advise him came back to learn from him. Annual meetings at Holkham, lasting a week, for the sheep-shearing and discussion of all things relating to farming became an established custom. At one of these, as we have seen, he had 7000 guests. Other landowners of the day did the same on a rather smaller scale, and this widespread interest in better farming was encouraged by the founding of the Board of Agriculture in 1793. This was not a Government Department, but a National Society created to learn from and give advice to farmers. It collected facts and figures about the new methods, encouraged experiments to increase production, and gave prizes for essays on farming, and for inventions. A drill plough was patented in 1781, a sowing machine three years later, a harrow in 1787, a reaper in 1799, and a haymaker in 1816, while an almost modern threshing machine was built by a man called Meikle in 1798.



[From a contemporary print in the V. & A. Museum, S. Kensington

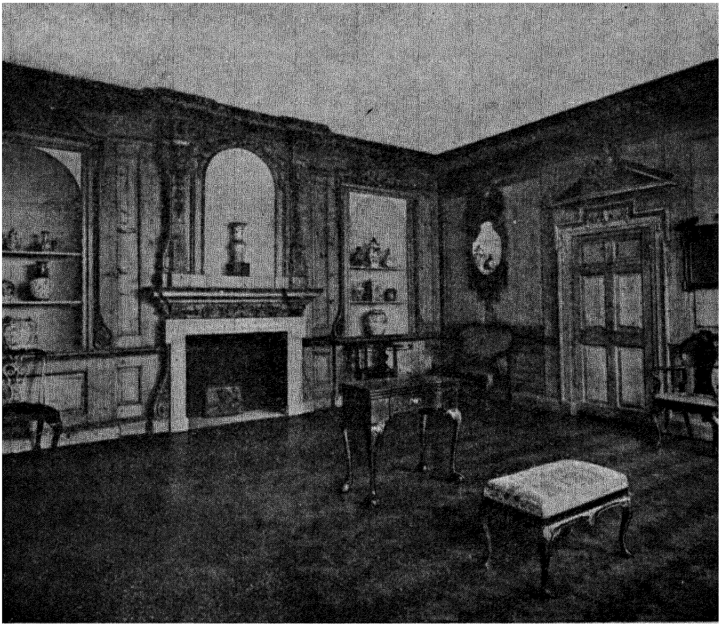
An eighteenth century family listening to father reading. This picture gives a good idea of children's costume in 1783.

§ 5

The Secretary of the Society was Arthur Young, who had farmed in England and Ireland, travelled in Germany and France, and written books on agriculture which were read all over Europe. The book about his French tours is very interesting, apart from farming, because it describes France in 1778 to 1790, the years just before the great French Revolution ; while *The Northern Tour* (1771), the best known of his English journeys, is interesting to compare with Defoe. Farming was decidedly awakening, but the roads still seem to have been much as Defoe knew them. Of the turnpike between Preston and Wigan, Arthur Young wrote: " I know not in the whole range of language terms sufficiently expressive to describe this infernal road . . . with ruts which I actually measured, four feet deep, and floating with mud, only from a wet summer. What, therefore must it be after a winter ? "

He saw the effect of such wretched means of communication on farming, for it not only made the market centres difficult to get at locally but also prevented them from being in touch with each other, so that the supplies and prices of food were very unequal in different parts of the country. Through him the Board of Agriculture did all it could to urge Parliament to encourage road improvements and enclosures. Unfortunately the society got into debt through the costly surveys it made in the hope of helping these two objects, and had to end its useful career in 1822.

There is another side to enclosures which can be seen very well in Oliver Goldsmith's *Deserted Village*, published in 1770 when the process was in full swing. He shows how the new methods which made enclosing essential, broke the yeomen farmers, the men who had owned small farms of their own. They could not, or sometimes would not, afford to practise the improved farming, and could not hope to compete against those who did. Thus their only course was to sell their farms to some big landowner who had the capital to run them properly, while they became tenants or labourers. The cottars, too, who had perhaps not owned land but had



[From the V. & A. Museum, S. Kensington

A beautiful panelled room, from a London house, about 1730.

kept their live stock on the common waste grounds, were hard hit when these were enclosed for tillage. So Goldsmith writes bitterly of the land " where wealth accumulates and men decay." The country certainly benefited by the new methods and agricultural changes, but the "yeomen of England" disappeared as a class.

CHAPTER III

THE GREAT INVENTORS

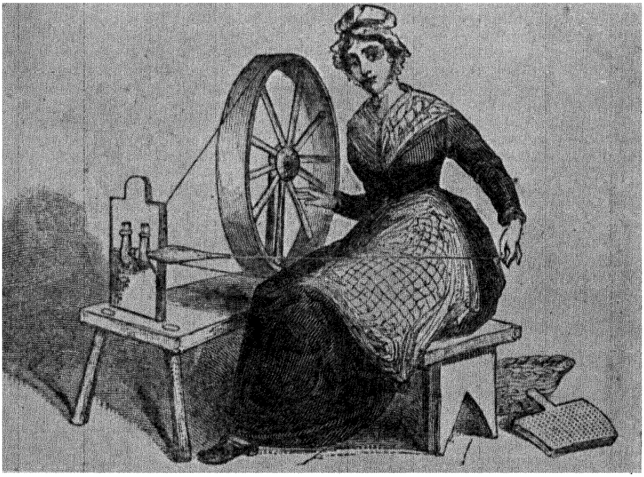
§ I

ALMOST side by side with the great changes in farming came what is called the Industrial Revolution of the eighteenth century, the change from the old Domestic System of men working in their own homes to the Factory System of to-day.

For many years the manufacture of woollens had been the most important industry in England ; but early in the eighteenth century a new industry, the manufacture of cottons, had been started and was slowly growing up. The East India Company had brought cotton goods to England and the people had found them pleasant and useful. The woollen manufacturers, afraid of their own trade, persuaded the Government to prohibit these new goods from being imported. This really gave a great chance for men to manufacture the cotton fabrics in England. So popular was the new fabric that many men were experimenting in quicker and cheaper ways of spinning and weaving it. Thus the long line of great inventions which have so completely altered the work of the world began first of all in this new cotton industry which was springing up in the hillside villages all over East Lancashire.

Spinning the raw wool into yarn or thread took longer than weaving the yarn into cloth. Roughly, it needed ten spinners to give one weaver enough thread for full time work, yet the first invention was on the side of the weavers. This was Kay's flying shuttle (1728).

The old hand looms on which the cloth was woven were heavy instruments with a frame on which the upright (or warp) threads were stretched in such a way that the even numbers of threads could be raised by pressing down a treadle with one foot and the odd numbers by pressing a second treadle with the other. The weaver raised the even numbers, threw the shuttle carrying the horizontal, or weft, thread across from hand to hand, lowered the even numbers and raised the odd among the upright threads and threw the shuttle again. So the threads crossed each other exactly as they do in really good darning, where the needle carrying the



[From E. Baines: "History of the Cotton Manufacture," 1835

A woman spinning on a one-thread wheel.

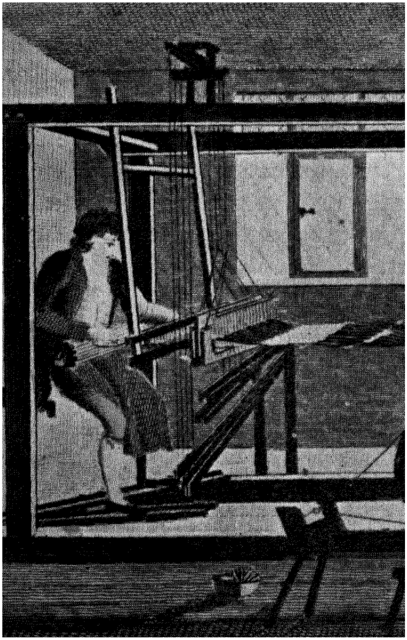
cross thread is put in and out between the other threads, over the first, under the second and so on, till it comes back again, going over the threads it went under before, and under those it went over.

The weaver thus used both hands and both feet, but every so often the cross threads had to be pressed close to each other with a comb, or " reed," as it was called. For this he had to stop, holding the shuttle in one hand and using the reed with the other. Kay's invention made weaving a much easier operation.

John Kay was born at Walmersley, near Bury in Lancashire. He probably got his interest in machinery from his father, who had travelled on the Continent to study it and had brought Dutch looms back to England. From him John also inherited a small woollen factory at Coggeshall in Essex, where he perfected his shuttle, though he probably first used it in Bury. This shuttle was worked by a string fastened to two levers fixed on the loom in such a way that a jerk of the string flicked the shuttle across one way or the other between them.

With this new invention the weaver had only to use one hand for the shuttle, and the other was free to use the comb, so that he never had to pause in his weaving. More, he could weave much broader cloth than in the days when he threw the shuttle from hand to hand and the width of the material depended on the width he could comfortably stretch in catching it. This made weaving almost twice as quick as it had been before, so that nearly twenty spinners were needed to supply one weaver with thread.

But the weavers themselves were not pleased with Kay's invention. They thought that now one man could weave twice as much cloth a day, fewer men would be wanted, and they would not be able to get work. In



[From the "Book of Trades," 1815

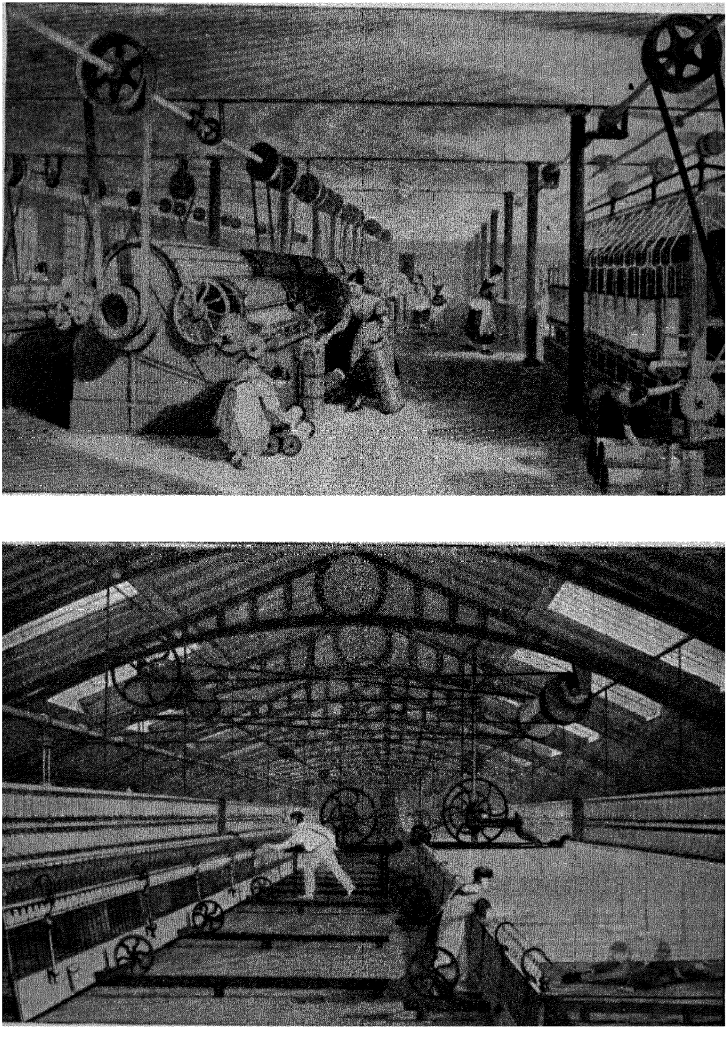
The weaver at his loom.

1753 a mob broke into his home and wrecked it, destroying his machines and burning, breaking, or stealing all his other property, and Kay, in disgust, left England. He went to France and died there in great poverty. His daughter soon afterwards went into a French convent, but his son, Robert Kay, undiscouraged, went on experimenting with machinery, and about 1760 he invented the drop box, which made it possible to weave several different colours of weft thread, one after the other, without stopping to change the bobbin in the shuttle.

§ 2

The spinners were left still further behind, until in 1764 James Hargreaves invented the spinning jenny.

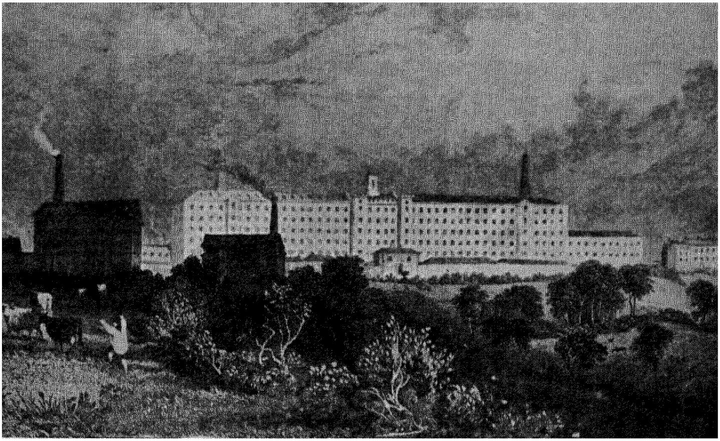
Hargreaves was a typical artisan or workman inventor of his day. He was born of a poor family living somewhere near Blackburn, and he became a carpenter and handloom



[From E. Baines: "History of the Cotton Manufacture," 1835

ABOVE.—*Women and Children at work in Cotton Mills in the nineteenth century.* **BELOW.**—*Spinning with the " Mules " in a Cotton Factory.*

weaver. His wife spun yarn for him, as all the women in weaving families did at that time. She took the fleecy rolls of carded wool (wool that had been worked between wire brushes until all the fibres lay straight), wrapped them round the spindle, and turned the wheel with one hand while she drew out and twisted the wool into a thick loose coil with the other. These thick bundles of threads were called "rovings." They were re-wound on the spindle and drawn out again, with more twisting, into thinner yarn, ready for weaving.



[From E. Baines: "History of the Cotton Manufacture," 1835

The cotton factory of Messrs. Swainson, Birley & Co., near Preston, Lancs.

Hargreaves was watching her do this one day when by accident she upset her spinning wheel, throwing the spindle from a horizontal to an upright position. The wheel and the spindle went on turning quite happily in this position and Hargreaves suddenly got the idea that a number of spindles could be set side by side in an upright frame and worked by one wheel, drawing out several threads at a time. His skill as a carpenter helped him to work out his idea and at last he made a machine with eight spindles that could twist eight threads at once, and called it "Jenny," in honour of his wife.

For a time he worked the jenny secretly in his own home, but his neighbours discovered that he was producing a great quantity of yarn and made sure he had another of the "engines" they so dreaded. In 1768 they attacked his house just as they had John Kay's, and smashed up his jenny. Hargreaves moved to Nottingham, made another jenny with twice as many spindles, and took out a patent[1] for it in 1770 Later the number of spindles was again increased from sixteen to twenty, then to thirty, and at last to 120.

§ 3

The next inventor was Richard Arkwright, more lucky than Kay and Hargreaves, for he made a fortune out of his inventions and became a knight and the owner of many mills. He was born at Preston in 1732, the youngest of a very poor family with thirteen children. He began life as a barber, in a little shop in a cellar, to which very few customers found their way. But young Richard meant to get on in the world. The usual payment for a shave in those days was twopence ; if people would not come to his poor little shop for that he would shave for a penny.

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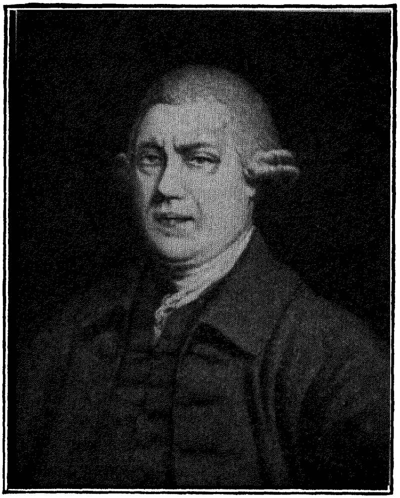
[1] If a patent is taken out, other people must pay the inventor if they wish to use copies of his machine.



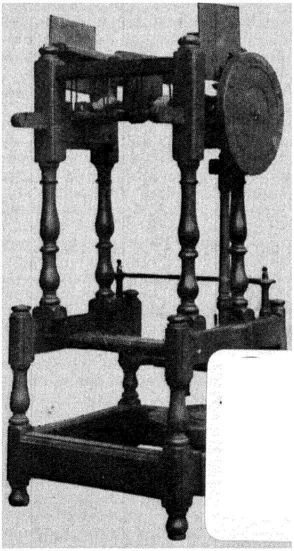
[Rischgitz

Sir Richard Arkwright.

He hung out a great sign: "Come to the Subterraneous Barber. He shaves for a penny!" Subterraneous means underground, and very soon a great number of the townsmen were being shaved underground in Richard's cellar. The other barbers angrily met together and decided they too would shave for a penny, and Arkwright lost many of his customers. However, he painted a new sign: "Come to the Subterraneous Barber. He shaves for one half-penny!" and got them all back again. Shaving for a half-penny made a very poor living, though, and it is lucky that just then Arkwright discovered a new way of dyeing hair for the wigs which all men wore in his time. He gave up shaving and took to wig-making. This was much more profitable and very soon he was travelling around the country buying hair from country girls at fairs and running his business on quite a big scale.

As he travelled with his wigs and his dye he saw and heard a great deal of what was going on in the cotton and wool trades. He grew interested in machinery and began to make small models of his own, experimenting in another new kind of spinning machine. He spent so much time on this that he lost all his trade and grew very poor again, so poor that one day his wife broke all his models, hoping that would make him go back to his wig-making. But instead Arkwright got permission to use a room belonging to the Grammar School at Preston, and there he and his assistant, a clockmaker and mechanic, set to work again on a larger scale and at last had the new machine running.

They worked with such secrecy that the Preston people thought they were practising witchcraft and magic, and two old women declared they had heard strange humming noises coming from the place as though the devil were tuning his bagpipes! But the finished machine could spin much stronger and more even thread than Hargreaves's jenny, and much more of it.



[*Rischgitz*

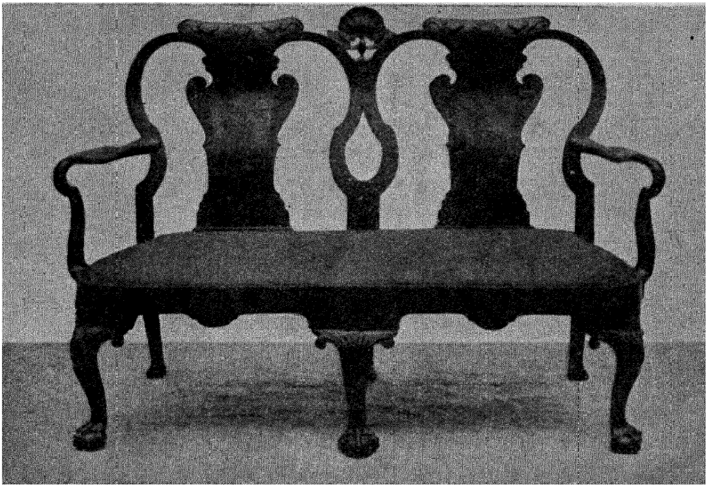
Sir Richard Arkwright's original spinning machine.

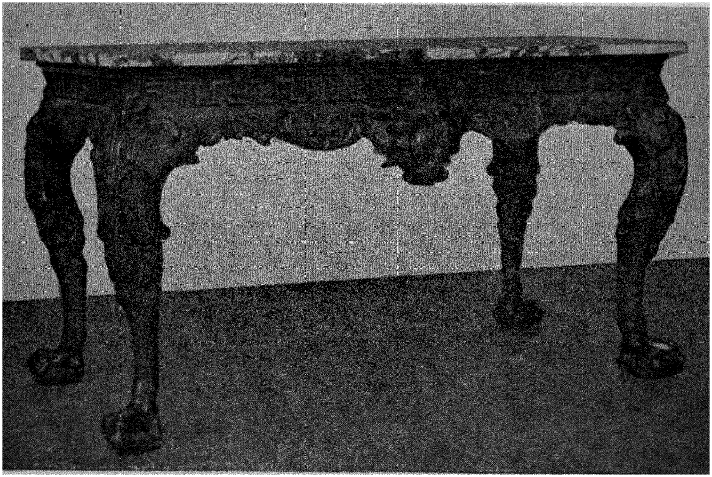
Arkwright moved to Nottingham and went into partnership with a firm of stocking knitters called Need and Strutt. Together they set up a famous spinning mill at Cromford in Derbyshire, where the new machine was worked by water power. From this it became known as the water-frame. Arkwright was not content to stop at this already considerable success. He worked from five in the morning till nine at night, and by 1775 had invented another machine which, besides roving and spinning, carded or cleaned the raw cotton as well.

He grew rich, but he met with many difficulties. One of his mills was completely sacked in a riot, others were attacked by mobs, and his inventions were copied by other manufacturers who did not pay for them. He found it hard to defend himself at law, because, owing to his very poor childhood, he could hardly read or write, and when he was over fifty he took an hour off the time he allowed himself for sleep in order to learn to spell better. He was also one of the first to use a steam engine as power in a spinning mill. Of this we shall see more in the next chapter. Altogether he worked so hard that he deserved his success, but that hard work does not always get its deserts is proved by the sad life of another inventor, Samuel Crompton.

§ 4

Crompton lived with his widowed mother in an old ramshackle house called Hall-i'-th'-Wood, near Bolton, which had once belonged to an ancient, well-known family. At fourteen he was put to work as a spinner, using one of Hargreaves's jennies. By sixteen he had become a weaver, but he found time also to attend an evening school in Bolton where he studied algebra and trigonometry. Though he was a very clever boy, he was shy and lacked confidence in himself. His father had left him a set of tools such as are used for organ building, and when with these he too began to experiment in making machinery, he carefully hid what he was doing. He worked at night, very slowly, earning money for





[V. & A. Museum

ABOVE.—*A lovely settee, of carved and inlaid walnut, made in Queen Anne's reign—now in the V. & A. Museum.* **BELOW.**—*Notice the beautiful carving on this walnut table. It belongs to the middle of the eighteenth century and is now in the V. & A. Museum.*

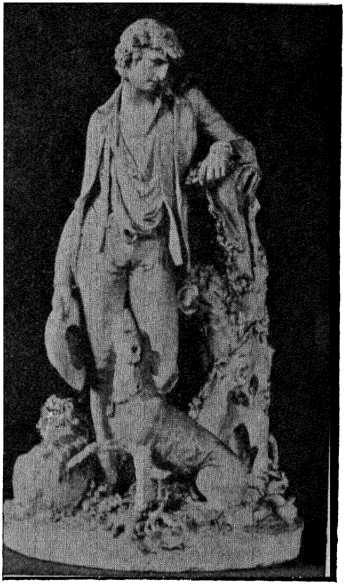
his materials by playing the violin in the orchestra of the Bolton Theatre. At last, after five years, he made a machine which combined all the advantages of Hargreaves's jenny and Arkwright's water-frame. He called this a " mule," and with it he began to spin better yarn than had ever been spun before.

But he was not to be able to make a profit out of his labour. No sooner did the manufacturers discover this wonderful yarn than they set about to discover the secret of its production. They besieged Hall-i'-th'-Wood, demanding to see the machine which could spin so fine a thread ; some climbed on ladders to look in at the window, others are said to have got up in a loft and pierced a hole in the ceiling to spy on Crompton's workroom. At last they persuaded Crompton to give up the machine on condition that they got up a subscription for him. Crompton naturally expected something really big ; what he got was scarcely £60. When he compared this pitiable sum with the fortunes others were making out of his invention, he gave up trying to invent in despair; he died in 1827, a poor and embittered man.

§ 5

The last of the great textile inventions, the power loom, was the work of a clergyman, Dr. Edmund Cartwright. During a holiday he talked at an inn with some merchants from Manchester and learnt of the great need for a loom that could keep pace with the new spinning machines. He grew interested, visited some mills at Cromford, and went home to try to improve on the machines he had seen. The result of his labours was a crude " power-loom." Later, he added to his invention, adapted it to the use of steam power, and set up a factory at Doncaster.

While all the main processes of spinning were now done by machinery many times quicker than previously by hand, another fifty years passed before the power-looms began rapidly to displace the hand-looms for weaving. Thus the number of hand-loom weavers increased immensely, to keep pace with the work done by machine spinning. For some years, "the golden age of the hand-loom weaver," they were busy and had good earnings. Then from about 1820, the power-loom, invented many years earlier, was so improved that it came quickly into general use. The change made cotton clothing even cheaper still for every one ; but unfortunately hand-loom weavers gradually lost their work, or had very small earnings and the older men specially suffered great hardships.

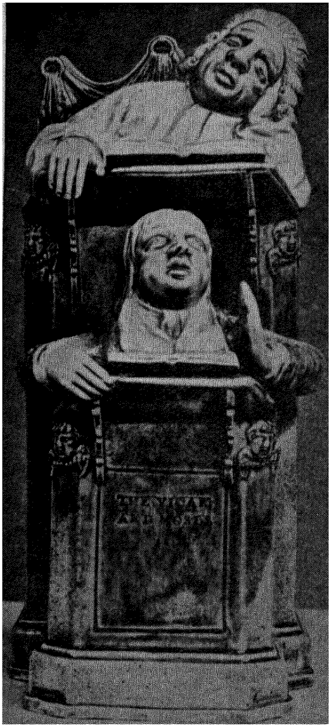


[From the V. & A. Museum, S. Kensington

A good specimen of English porcelain made about 1800.

People are "of all baggage the most difficult to move," and many whose work disappeared with the changes were far away from the new centres where they might easily have found fresh employment. Often, they scarcely knew what was happening.

Many fortunes were made and many great firms were founded in Lancashire in those days. One of them was the firm of Horrocks Bros., now Horrocks Crewdson, Ltd. John Horrocks began with one spinning frame which he worked in an old quarry belonging to his father. To-day the Horrocks Crewdson mills cover many acres in Preston, Bolton, and Manchester, and you can see advertisements for the famous Horrocks longcloth in *Punch* and other papers. Lancashire still remains the centre of the cotton industry, partly because of its damp air, which is good for the spinning, its nearness to coal mines, and its great port, Liverpool ; but also because young and enterprising men are to be found there who have grown up in the cotton business and know it well, and because young workers learn their trade from their wonderfully skilled parents whether spinners or weavers. Also many firms who buy raw cotton or who sell cotton goods, or who make machinery for the mills have grown up there with the main industry. Thus a man who wishes to start a new cotton business more easily finds in Lancashire the materials, the machinery, the experienced managers and skilled workmen he needs,



An amusing ornament made of coloured and glazed earthenware at the Burslem potteries (late eighteenth century). It is now in the V. & A. Museum, S. Kensington.

and so is likely to go there; and thus the industry has continued to remain in that area and to grow up there.

§ 6

It was also during the later years of the eighteenth century that the foundation of another of England's big industries was laid in a different county. The potteries of Staffordshire owe their fame to the inventions of Josiah Wedgwood.

Before the days of Wedgwood very few poor people could afford to use pottery. They ate and drank out of wood and pewter, or sometimes horn. Josiah's family had been potters for many years and he began his work as a boy at Burslem, " throwing " clay for the potter's wheel. Soon he became a modeller, and made experiments which led to his being appointed the Queen's potter in 1762. He discovered and invented so many improvements and machines for the mixing of clay and the modelling and glazing of china that he turned the potter's small and often crude trade into an art, and an industry of national importance. He took very great pains with his work, improving tools and material, and making designs which were both useful and beautiful. Through him earthenware and *china* came into much more general use in English homes, and some of his own most beautiful pieces are kept to-day in museums or eagerly sought by private collectors. At the same time, at Bristol, Worcester, Coalport and elsewhere there were other progressive and successful pottery works almost as well known even as those of Josiah Wedgwood.

CHAPTER IV

IRON AND STEAM

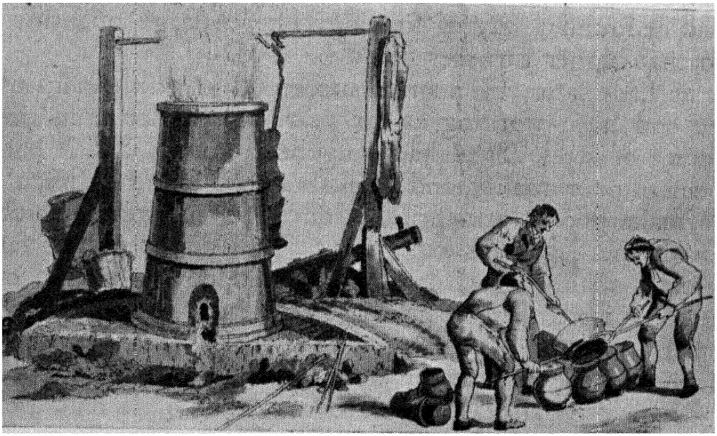
The Great Mechanical Engineers

§ 1

That steam was a force was discovered as long ago as 130 B.C. by Hero, a Greek of Alexandria, but the engines he made were only toys, and toys on whose behaviour he could not really depend at that. In England men began to try to find a way for using the energy of steam early in the seventeenth century, but it was not until the very end of that century that a man named Captain Savery succeeded in making a very clumsy steam engine, or "fire-engine," as he called it, which could be used to work a pump for drawing water out of mines.

This engine was improved and fitted with a piston a few years later (1705) by Thomas Newcomen, a blacksmith of Dartmouth, and it was used with fair success in pumping the water from several of the Cornish tin mines.

At first it was slow, cumbersome and wasteful, but as time went on small improvements were made. One of these was due not to the study of any inventor but to the natural desire of a boy called Humphrey Potter to play instead of work. Humphrey's job was opening and shutting the tap, to let the steam into the cylinder at the right moment. One day he saw that if he tied a string between the tap handle and the moving beam it would be jerked open and drop back by itself, while he could play marbles near by, watching in case the string broke. This not only made the engine self-acting, but also, when it was properly arranged, increased the number of piston strokes from six to fifteen or sixteen a minute, and, of course, made the pumping much quicker.



[From W. H. Pyne's "Microcosm," 1803

Men working at an iron foundry in the early nineteenth century.

No very great advance could be made in steam engines, however, until better ways had been found for working the iron of which they were made. The pistons often fitted very badly, some of the piston shafts were faulty and broke, and the cylinders sometimes warped. For iron in those days was smelted in small charcoal furnaces and cast, or shaped, with very poor tools. Two men, Abraham Darby, an iron-master, and John Huntsman, a clockmaker, were working at the same time, unknown to each other, to improve matters. Though the furnaces were small they used up a great deal of charcoal, and a very large number of trees had to be cut down to keep them going. In the eighteenth century the demand for iron for all the new machinery was steadily getting bigger and the number of trees which could be used for charcoal was steadily getting smaller. Then Darby discovered that coke, made from coal, could be used for the smelting (separating the iron from the iron ore) instead of charcoal, and he found a way of making coke in large quantities so that bigger furnaces could be used.

A little later, Huntsman succeeded in an experiment he had been working at for years ; he discovered the secret of steel. Steel had long been known but it had been of poor quality, and Huntsman had found it difficult to make good clock-springs from it for his work, which is why he began his experiments. His discovery was far greater than he had dreamt it would be ; the kind of steel he succeeded in making was fit not only for clock springs but for all types of cutlery, tools and implements. Iron and all the softer metals could be cut and shaped with it with an ease and accuracy that, if it had ever before existed, had long ago been lost.

For a time Huntsman kept his secret, and made such a good business out of it that in 1770 he was able to build a factory in Sheffield, where his process was found out and copied by others, with the result that Sheffield sprang rapidly into fame as the most important steel-making centre in the world.

Darby's furnace had been improved on by Dr. John Roebuck, of the Carron[1] Iron Works, who invented a wheel which could be turned by water power to work

[1] Near Stirling, Scotland.

bellows producing a much bigger " blast " or draught than the old hand bellows. Thus the coke could be made to burn at as great or even greater heat than charcoal, a thing which had not at first been possible.

§ 2

Yet even then British iron remained so inferior in quality that the British Government itself would use none of it, but always imported from Sweden or Russia. This fact greatly struck Henry Cort, a young man of twenty-five, employed as a naval agent in London. He set himself to study the British iron industry in the hope of finding out what was wrong, and became so engrossed in the problem that he gave up his post and opened a small foundry of his own at Fareham. There he made such enomous improvements in the processes of " puddling," or refining iron, and of beating and rolling it that he may almost be said to have invented the puddling furnace and the rolling mill. But unfortunately he had taken as a partner a man whose father, an official in the Admiralty, had advanced large sums of money to them for their experiments, and suddenly in 1784, it was discovered that this money had been stolen from the Admiralty. The Government at once seized Cort's foundry, and though he had of course believed that the money really belonged to his friend's father he was plunged into poverty and died in a slum in 1800.

Meanwhile the man who was to become the most famous of all the mechanical engineers of the eighteenth century was at work on the steam engine.

§ 3

James Watt was born at Greenock, in Scotland, in 1736. His father was a shipwright, a well-to-do man who could have sent his son to a good school, but Watt was so small and delicate that he had to be taught at home. At a very early age he knew all the arithmetic his mother could teach him, and even used to catch her out in calculating wrongly, until the poor lady got flustered and handed him over to his father. Later, his father decided that as he was so good at figures he had better learn the trade of a mathematical instrument maker, and in 1754 James was apprenticed to an optician in Glasgow.

Again, in his rather trying manner, James quickly learnt all this good man could teach him and found the optician unable to answer so many of his questions that after a year he impatiently broke his apprenticeship and went to London to learn more. On his return to Glasgow he set up his workshop inside the University where much of his time was occupied in making and repairing apparatus needed by students and teachers in their science classes.

He was now twenty-two and the real interest of his life had become steam. He read all he could get hold of about it and made experiments and models, but it was not until the winter of 1763-1764 that he got his great chance. A working model of Newcomen's engine was given him to repair.

Watt saw at once how faulty it was, and how wasteful of steam and fuel. He repaired the model quickly and then worked night and day at another model of his own which was to improve upon it. In the old engine

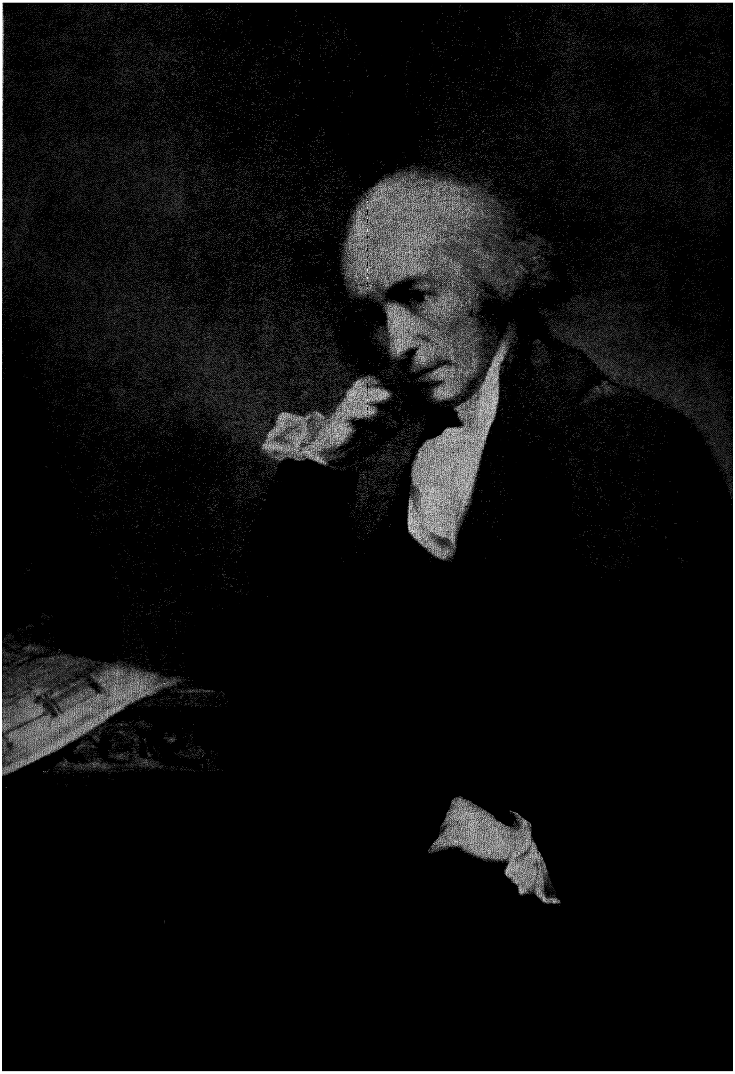


Photo. Mansell] [*Nat. Portrait Gallery*

James Watt.

the steam which forced the piston up was condensed by squirting cold water into the cylinder and the water drained off so that the piston fell again by its own weight. The cold water, of course, cooled the sides of the cylinder so that the next rush of steam was also cooled a little against them and lost force, for the hotter steam is the more powerful it is. Watt saw that the cylinder must be kept hot, but for a long time he could not think of a way of getting rid of the steam in the cylinder to make room for the next lot without squirting in something cold to condense it.

Then at last one day while he was out for a walk an idea came to him. He would let the steam escape out of the cylinder and condense it in a separate chamber, through which cold water could be squirted without touching the cylinder at all. He rushed back, collected a few pieces of apparatus from friends and set to work early the next morning. The model he succeeded in making fulfilled his expectations. It was faster, more powerful, and burnt less fuel than Newcomen's, but Watt had neither the money nor the mechanical means to make an engine big enough to show that his discovery would be useful to manufacturers.

Though he knew his engine could revolutionise the industrial methods of Britain he could find no one in Glasgow who would take it seriously, and he was almost in despair when he got an introduction to Dr. John Roebuck, who, as we have already seen, invented the blast furnace at the Carron Iron Works. Roebuck agreed to help him for two-thirds of any money that might be made from the invention. Watt, who was a very bad business man, agreed, and a patent was taken out in 1769 and an engine made at the Carron Works. But the workmanship was bad—Huntsman's steel tools were not yet in use there—and the trials of the engine were unsatisfactory. Roebuck lost interest in the attempt, and, as very soon after he also lost a lot of money in his business, Watt had to leave him to take to canal surveying for a living, for by that time he had a wife and family to support.

This new work brought him south and he met a Birmingham manufacturer called Mathew Boulton, whose partner he became, the agreement with Roebuck being cancelled. If Watt had been able to search the country from end to end he could not have found a better partner than Boulton. Poor Watt had grown very irritable and tactless through misfortune and ill-health; he was nervous and shy, and bad at business. But Mathew Boulton was not only an excellent and honest business man but also a man of the world, with charming manners and plenty of patience—the very man to help Watt to turn his brains to the best possible advantage.

§ 4

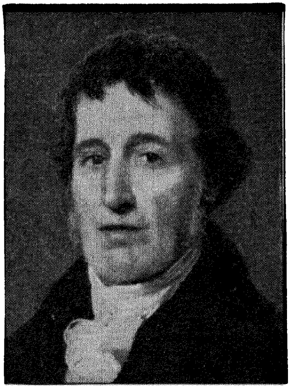
In the hands of the skilled workmen in Boulton's factory, the steam engine was made to work so that it could be used in a factory. It was still very crude. The workmen had few tools to help them, and really accurate boring or drilling was very difficult. As a result the parts of the engines often fitted badly, much steam escaped, the engines were hard to keep going, and often stopped altogether. Later on, as better workmen were trained up and as accurate machine tools were invented, steam engines were used everywhere to drive the machinery in the factories. Another big step forward was thus taken in our ability to make all manner of things much

[From the "Book of Trades," 1815

The early nineteenth century coach-maker at work. He was a very busy man.

more quickly, and more cheaply. In those years England was for a time truly the workshop of the world. Quite early, however, some enterprising men gave orders to Watt and Boulton for their engines.

The first of Watt's engines began to run in 1776, the year of the American Declaration of Independence, and later on in the same year the second was set to work in Cooke & Co.'s distillery at Stratford-le-bow. Others were sent to the Cornish mines to replace the old wasteful Newcomen type. Then Boulton and Wilkinson used a slightly adjusted pattern to work their steel rolling mills. Thus Watt's engines were spreading everywhere, and he continued to work at them and improve them. By 1782 he had developed the rotative engine, helped by his foreman, William Murdock, and the same year he took out patents for a "double-action expansive working engine," in which the piston was worked both up *and down* by steam, a great improvement on the old



William Murdock.

days when it fell by its own weight. In 1786 the famous Albion Flour Mills were built, and were worked entirely by steam. In 1790 Arkwright fitted a Boulton and Watt steam engine in his Nottingham cotton mill, completing the links in the circle of the coal-iron-steel and textile industries. " Textile industries " includes not only cotton and wool weaving but also silk, linen (made from the flax plant), and jute which is woven into sacking, huckaback, mattress covers, awnings and carpets, and spun into string and rope, hosiery and lace. Gradually, the machinery in all these works was driven by steam power. The steam engines depended on steel and iron; the iron could only be worked through coal; thus every one of these great industries grew up interlocked and dependent the one on the other.

It was also in these last teeming years of the eighteenth century that Murdock, Watt's foreman, made the first travelling steam engine (1790), a small ricketty affair, but important as the ancestor of Stevenson's " Rocket," and through it of the great locomotives of to-day.

So we see that Mathew Boulton spoke the truth when he said to George IV, " I sell, Sire, what all the world desires—*power* "—a bold quibble to offer a King.

Watt was able to retire, a rich man, to a beautiful house called Heathfield Hall, where, though he had been delicate all his life, he lived happily to the age of eighty-three.

CHAPTER V

ROADS AND CANALS

The Great Civil Engineers

§ I

FOR these great changes to take place in our industries, equally great improvements were needed in the means of transport. To build the new factories coal, building materials and machinery were required in immense quantities; to keep them at work, continuous supplies of coal and raw materials, such as cotton, had to be sent to them; their finished goods had to be distributed over England or sent to seaports to be shipped to customers in all parts of the world. Again, wherever there was coal and iron, as in the Midlands, in Lancashire, in Yorkshire and in Durham, villages were expanding quickly into small towns and small towns into large ones. And, London was becoming the greatest trading city in the world and its numbers were increasing very rapidly.

Then, in addition to moving materials, it was necessary to send more and more food from the country to all these towns to feed their people. The wheat and meat and vegetables, provided in much greater quantities by the improved methods of farming, had to be sent to feed the growing army of industrial workers. The few navigable rivers and the bad English cart tracks of Defoe's time were unable to carry this great increase of traffic, so we find that while the changes in industry were taking place, men were engaged in constructing canals, and new and better roads.

The need for a better method of sending his coal to Manchester, led the Duke of Bridgewater to consult a rising engineer, James Brindley. The Duke had collieries at Worsley and from there the coal was sent to Manchester in baskets slung across the backs of horses or mules. Already he had heard of the great value of several very small stretches of canal which Brindley had built to enable small boats or barges to pass from one river to another. He decided that a canal was necessary between Worsley and Manchester and employed Brindley as his engineer in charge of the work.

[From W. H. Pyne's "Microcosm," in 1803

Pack-horses carrying loads from the lime-kilns in the days of bad roads.

James Brindley was the son of a cottar in Derbyshire, where he was born in 1716. His father was an idle,

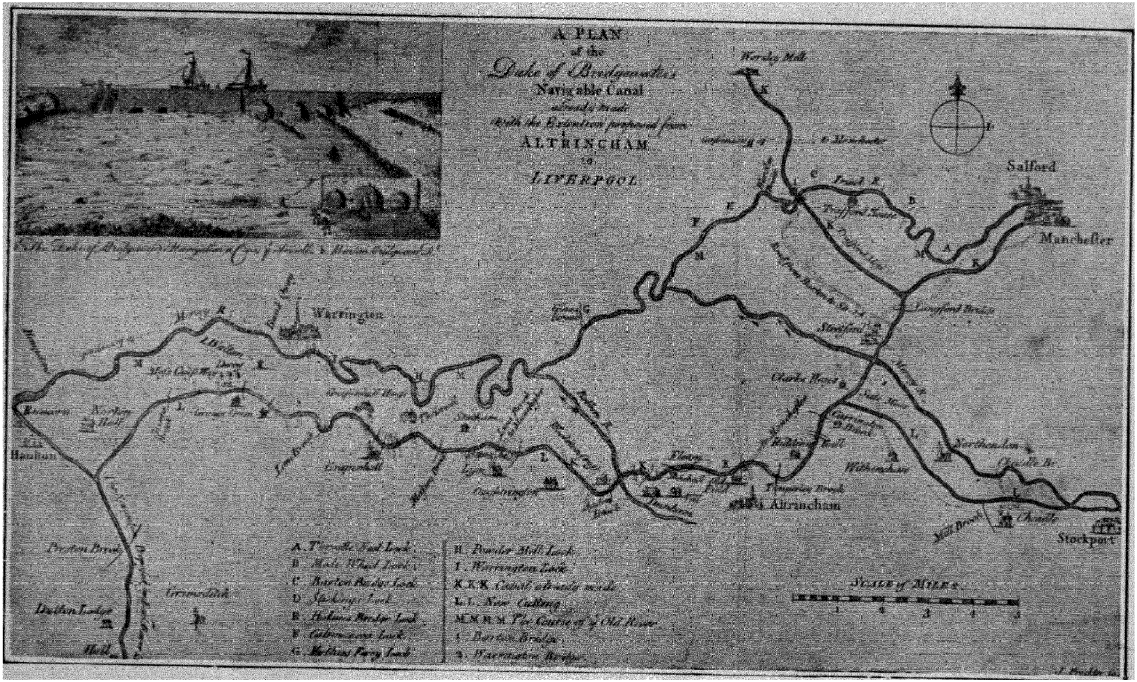
[From the "Book of Trades," 1815

The early nineteenth century waterman plying his boat—the two women are waiting to be rowed across the river.

careless fellow, very fond of bear-baiting, cock-fighting and other cruel sports of the time, and very neglectful of his family. James was never given the opportunity to learn to read or write, and might have remained a farm labourer all his life but for his mother. When he was seventeen she managed to arrange his apprenticeship to Abraham Bennet, a millwright engineer of Macclesfield. There he must have shown some of his father's qualities, for Bennet wrote to his mother threatening to dismiss him as a lazy and bad workman. But, just as Bennet was on the point of packing young Brindley off, the firm received a large contract for machinery in some paper mills, which needed all the workmen, good or bad. To every one's surprise Brindley did very well indeed on this job, showing such cleverness with machinery that he became head of that side of Bennett's business, and was soon famous for repairing machinery and improving mills and pumps. Later, he showed equal promise as a surveyor, and it was in that capacity that Earl Gower employed him when the Mersey-Trent canal was proposed, through which the Duke of Bridgewater heard of him.

So Brindley came to build the great Bridgewater canal from Worsley to Manchester. He was a practical man with no education, but the plan on which he worked showed real genius. Water can only run downhill, and in a hilly country making a canal is no easy business. Brindley, however, overcame all difficulties. He began his canal through a tunnel cut straight from the coal workings, he burrowed through hills and built across bogs on watertight embankments of his own invention, and finally he carried his canal over the river Irwell in an aqueduct. He trained workmen, the first professional "navvies" (navigators) in England, and he fitted up special boats as floating forges and carpenters' shops, which could follow along each section of the canal as it was made. Other boats carried forward his building materials and carted away the earth and stones he had dug out.

The success of the canal was complete. One of its immediate effects was to reduce the cost of carrying coal so much that the price in Manchester went down from 1*s.* to 4*d.* per hundredweight. The Duke at once decided to extend the canal to Runcorn and so link up his colliery with the port of Liverpool. After much opposition he got an Act through Parliament in 1762 permitting him to do this, and Brindley again set to work. Once more his methods amazed the engineers of his day. He discovered a way of underpinning the earthworks of the canal which enabled him to carry it straight across the great moss-grown marsh of Sale Moor, keeping it on one level all the way and avoiding locks.



A Plan of the Bridgewater Canal, 1769.

As the Duke of Bridgewater had used all his available wealth, he borrowed from London bankers the money to build his second canal by pledging to them this first canal, which was now a valuable property earning a large income. When, however, the whole canal was completed it was used so much in preference to the bad roads both for goods and passengers that the Duke made a big fortune out of it, and he did not forget Brindley.

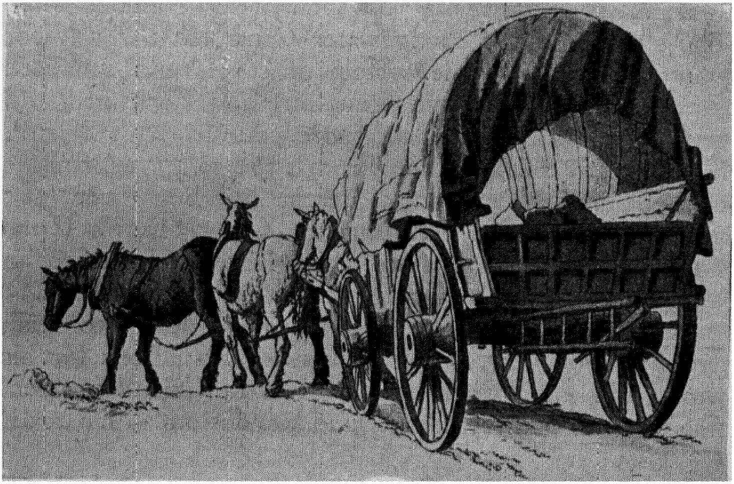
Brindley, indeed, was by then a very famous man, The success of the Bridgewater Canal led the way for many others; a whole system of canals and canalised rivers was built through Lancashire and Yorkshire, and were developed to connect those counties with Bristol, Birmingham and London. From 1762 to 1772 Brindley worked himself almost to death, building over 365 miles of waterway, including the Grand Trunk Canal which joined the Trent and the Mersey, the project in which Earl Gower's plans had failed ten years before.

To the end of his life Brindley never learnt to spell, and he made very few drawings or calculations for his work. His habit when he met an extra difficult problem was to go to bed for the day and work it out in his head!

§ 2

Another great civil engineer of the time was John Smeaton of Leeds (1724-1792). His father was an attorney, and though John had no taste for the law, and spent all the time he could in making models and drawing plans, nobody took them seriously, and at sixteen he was sent straight from Leeds Grammar School into his father's office. Two years later he went to London to complete his legal studies. There he met a number of men whose interests were, like his own, scientific, and through them he came to be known to the Royal Society. Finally, he gave up the law altogether and opened a shop, which must have been fairly prosperous, for in 1754 he was able to go abroad for a year to study canal and bridge building in Belgium and Holland.

Just after his return the Eddystone Lighthouse, which guards the reefs off Plymouth harbour, was burnt down, and the President of the Royal Society was asked to find an engineer to erect another. This was the second Eddystone Lighthouse to be destroyed, the first, a crazy wooden structure, having been blown away in a gale. Something practical and permanent was needed and many men were asked to submit plans. Smeaton was included quite low down on the list, but it was his ideas which were



[*From W. H. Pyne's "Microcosm," 1803*

These great covered carts were in common use in the early nineteenth century.

finally adopted, and from then he adopted engineering as his work. He built bridges in the north, four of which still stand and are daily used in Perth, Banff, Coldstream and Edinburgh. He constructed the Forth and Clyde Canal, following the line taken by the old Roman wall of Antoninus; he planned Ramsgate Harbour, and he thought out many more schemes for draining, bridging and roadmaking which were never worked at because sufficient money could not be spared for them.

Yet, though he was so often disappointed in getting his ideas adopted in England, he was proud of his country and would not leave it, even when in 1774 a Russian princess offered him an enormous salary to go and work in Russia. He stayed, and became responsible for a large section in the 3000 miles of canal which were rapidly opened up in Britain, consoling himself when this world grew particularly troublesome by his hobby of studying the stars.

§ 3

Another canal builder, and perhaps the greatest civil engineer of his time was Thomas Telford, " who by his roads bound England and Scotland into one, and rendered the union a source of wealth and strength to both."

Telford was born in 1757 in a remote little village called Westerkirk in Dumfriesshire. His father was a shepherd, his mother a milkmaid, and he too began life on a farm, only " drapping in noo and then " to the parish school at Eskdale. He was so good-natured and fond of jokes that every one called him " Laughing Tam," and the nickname stuck to him when at fifteen he was apprenticed to a mason at Langholm. This was near the estate of the Dukes of Buccleuch, and a new Duke having just inherited, the estate was being put in order and improved, which gave young Telford at once a much wider experience than he would otherwise have had in many years. His eagerness to learn, his naturally charming manners and his infectious laugh made him a general favourite, and brought him to the notice of a lady who gave him the free run of her library. There he read and read as he had certainly never done at school, and developed a deep love of poetry, particularly of Milton and Burns.

By the time he was twenty-two (and a journeyman mason earning 1*s*. 6*d*. a day) he had poems of his own accepted by the Edinburgh Magazine, and Edinburgh was also to start him on his far more famous career as an engineer. For it was there that he came in touch with the Commissioner of Portsmouth dockyard, in whose employment he learnt surveying, while he spent his spare time studying chemistry and writing poems. Very soon his exceptional and very varied ability was recognised. He was asked to supervise the repairing of Salisbury Castle, which led to him being appointed Surveyor of Public Works for Shropshire, and a few years later he became agent, engineer, and architect for the Ellesmere Canal. This canal connected the Severn, the Mersey, and the Dee, over one loop of which it was carried in an aqueduct, while another aqueduct carried it over the Ceiriog at Chirk. Telford's aqueducts were a great advance on Brindley's, which had been lined with a bed of puddled (packed) earth, so heavy that it needed a great mass of masonry to support it, and was not always watertight. Telford lined his with a thin cast iron trough. This permitted him to use much wider spans between the arches and so to build more quickly and more cheaply.

The success of this canal made his reputation. During the next eighteen years he was employed in improving the Port of London, in building the first iron bridge (over the Severn), inspecting harbours for the Governor of British Fisheries, constructing the long Caledonian Canal right across Scotland from the Moray Firth to Loch Linnhe, and, most important of all, in building roads. In Scotland particularly the roads were so bad that it was impossible to develop farming, mines or fisheries, and many of the people were "ill-fed, half-barbarous and habitually indolent." A little had been done when the Government found how difficult it was to move troops

[From W. H. Pyne's "Microcosm," 1803

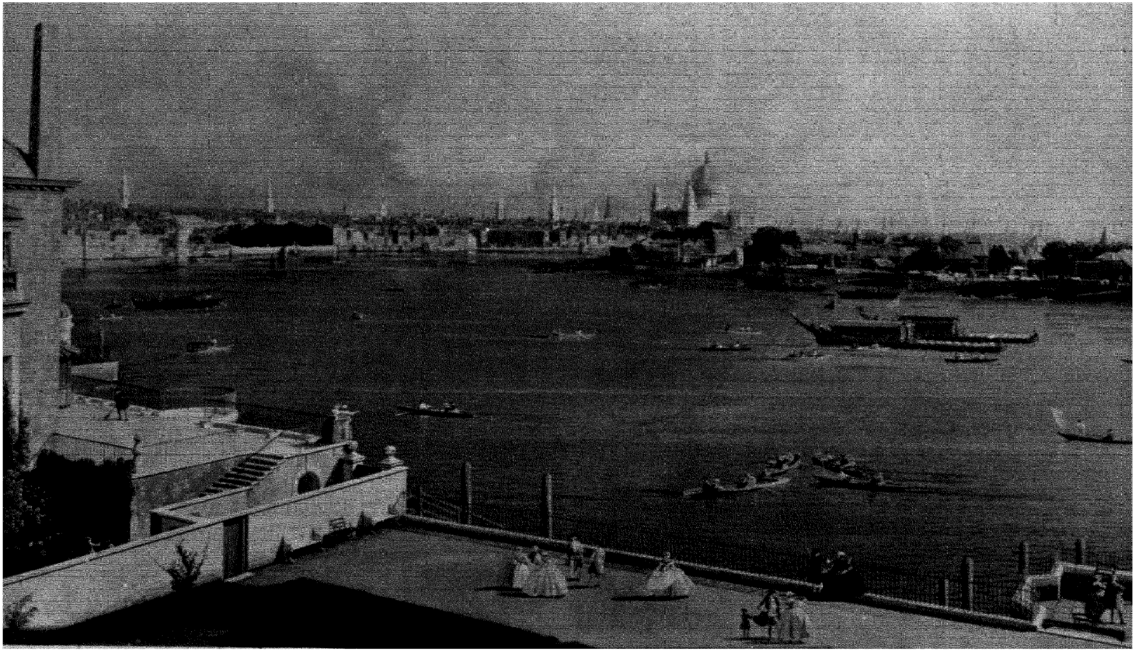
***An** early nineteenth century stage-coach.—Note the place for luggage at the back.*

against the Stuart Pretenders in 1715 and 1745, but it was Telford who did the first systematic road planning, which opened up the country and brought about the free passage of trade and travellers between Scotland and England. He built altogether 920 miles of highway and over 120 bridges, and so helped to change the Scottish people quickly from an " ill-fed and half-barbarous " nation into one of the most progressive in the world.

Then Telford came to London (where he died in 1834), and there is a story which shows he was " Laughing Tam " to the end of his life. For several years he lived at the Ship Hotel, where his gaiety and good stories attracted so many guests that the landlord was able to retire. Almost at the same time Telford bought a house of his own, and when he told the new landlord he was leaving, the good man cried, " What, go, sir? You can't go—I've just paid £750 for you! "

§ 4

But though Telford's roads were very good they were also very expensive to build, and it was left to another Scotsman, John McAdam (1750-1836), a descendant of the famous clan McGregor, to find a way of road-making which was good and inexpensive. When McAdam was quite a boy at school he made a model section of a road with a surface of small broken stones, packed hard and rolled smooth, which is the principle of all the " macadamised " roads of to-day. When he grew up he made experiments on a large scale, in Scotland, and around Falmouth and Bristol. He used to travel in a carriage drawn by two horses, with a great Newfoundland dog and a little pony trotting behind. The pony he



Canaletto.

London from Richmond House, 1746.

Rischgitz.

Facing page 82.

used to carry him to places off the main roads, where his carriage could not pass. At last he succeeded in finding the best kind of stones to use for his foundation and road-surface, which was slightly curved in order to drain it, and he helped to plan, repair and build a great network of roads for the mail coaches of the day.

Fairly good coaches had been used by a few of the richer people in England since the sixteenth century, but towards the end of the eighteenth they had been so much improved by a man called Palmer, of Bristol, that travelling became almost twice as quick, and far more general. Regular services of stage coaches arose, and in 1784 they were given the mails to carry and became mail coaches. On McAdam's new roads the mail coaches could average eleven or twelve miles an hour over long journeys, a speed undreamt of thirty years before.

CHAPTER VI

WORLD HISTORY (1756-1815)

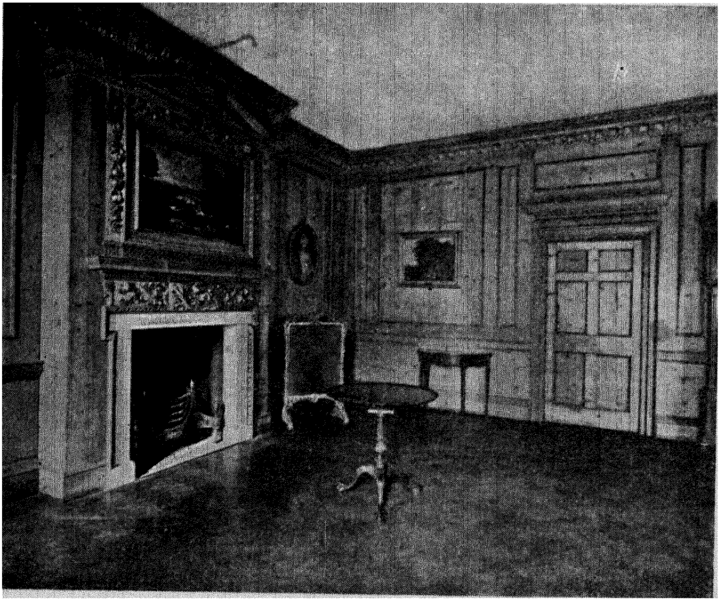
The Old World and the New World

§ 1

IT is a very interesting question to ask what caused these amazing changes to take place in the eighteenth century in England, but it is a difficult one to answer correctly. For part of the answer we must go back to the times when Flemish weavers, driven from their homes, settled in England and when many French craftsmen, to escape from religious persecution, fled to our shores. These men were highly skilled in many crafts and they gave great assistance to English industry. In weaving, glass-making, printing, and many other crafts they added new knowledge and greatly improved the quality of English manufacture. Similarly, Italian and Dutch engineers helped to drain great tracts of boggy lands, such as the fens, to improve our harbours and to build water-works.

For a second and even more important cause, we must go back to the wonderful geographical discoveries of the fifteenth and sixteenth centuries. Spain, Portugal and Holland were, each in turn, carrying on a rich trade along the new sea routes before the work of Englishmen became important. In the time of Drake, however, English seamen plundered the Spaniards; later, English adventurers explored the North Atlantic for sea routes to the East Indies. Traders struggling against French and Dutch began English commerce with the East.

Groups of merchants, in the seventeenth century, formed foreign trading companies. The Russia Company traded with Russia and Eastern Asia; the Eastland merchants with Norway, Sweden and the Baltic; the Guinea Company sent ships to West Africa; the Virginia Company traded with the new settlements in America; while the most important, the East India Company, brought to England the spices and cottons and many



[From the V. & A. Museum, S. Kensington

A beautiful panelled room in a well-to-do English house of the eighteenth century.

other products of India and the East Indies. All this new trade with new foreign markets was steadily bringing great wealth to English merchants who were stirring up the craftsmen to provide them with more and more goods to send abroad in their ships.

[*Mansell*

Robert Lord Clive, Baron of Plassey.

A further important cause must be mentioned. In Genoa, and in Amsterdam there had been, for many years, banks which greatly assisted the merchants of those towns. In 1694 (William III's reign), the Bank of England was formed and was followed soon after by other banks in London. They acted as a kind of reservoir, gathering in the savings of rich people and lending them to merchants and to manufacturers who could use them profitably. In this way the merchants were helped to buy goods which they sent all over the world, the manufacturers were helped to make use of the new inventions, to buy raw material and to employ workers on an ever increasing scale.

We must not forget the improved farming which gave more and cheaper food to the people and enabled the rapidly growing population to be maintained. Without the improved farming, this great growth of industry could certainly not have taken place.

Thus the foreign craftsmen settling in England, the explorers of the fifteenth and sixteenth centuries, the great trading companies of the seventeenth century, and the bankers who gathered together and made more useful the riches of a prosperous nation, all were leading over a long period of time to that *Industrial Revolution* which changed the north of England from a poor and thinly populated district into an area covered with large and rich manufacturing towns, finding employment for many thousands of persons.

§ 2

In all this wonderful growth of trade and empire, English sea-power gave immense assistance; Spain and Holland we outstripped in the sixteenth and seventeenth centuries; in the eighteenth century, our rival was France and we were at war with her on and off for over a hundred years. "I want to call England out of that lethargy in which twenty thousand men from France can shake her!" So declared William Pitt (the Elder), when he became George the Second's chief minister in 1757, in the middle of one of these wars which was going badly for England. With his coming, however, the Seven Years' War was turned into one of the most glorious that England had ever fought; its results were so far-reaching that the British people look back to Pitt as the man who made an empire out of the accidental settling of adventurous traders and the spreading of men in search of new homes.

Pitt did not come into power as a member of one of the great Whig land-owning families who had brought the Georges to the English throne, and who controlled Parliament and the government of the country. He came to voice the opinions and carry out the ambitions of the merchants and traders who, though they were making England wealthy and prosperous, had as yet little power in the government in their country.

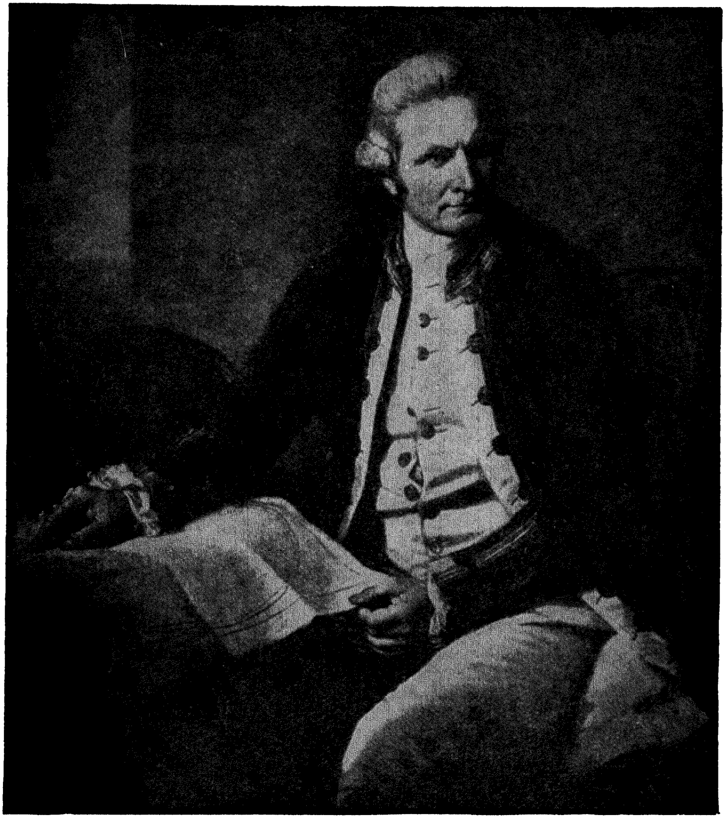
"The Great Commoner," as they called the elder Pitt, knew how to arouse and appeal to the patriotism of trading England. He knew too what she needed; for London merchants were his friends, and colonies his interest. When he was a boy at Eton his grandfather would tell him stories of how he "ruffled it in Madras," and of the fortunes to be made in India. And Pitt supported the East India Company, though men in his day hardly realised that they were founding the British rule in India.

In his early days in Parliament, Pitt had watched Sir Robert Walpole at work, making England prosperous and keeping her at peace. He had seen, however, that the peace could not last, but that France, England's great colonial and trading rival, must be met, not perhaps in Europe, where England and France had fought in older days, but in India, in America, and on the high seas.

Clive's success in India (Plassey, 1757), and Wolfe's success in winning Canada from the French (Quebec, 1759) were among the great results of that Seven Years' War which ended in 1763. Thus, Pitt's plan of conquest decided the destiny of the northern continent of the New World—that it was to be in the hands of English-speaking people, not French.

Yet, a few years later, in 1775, war broke out between England and her thirteen American colonies south of Canada. On July the 4th, 1776, the Americans made the declaration that "These united colonies are, and of right ought to be, free and independent states," and a new nation, the United States of America, came into existence.

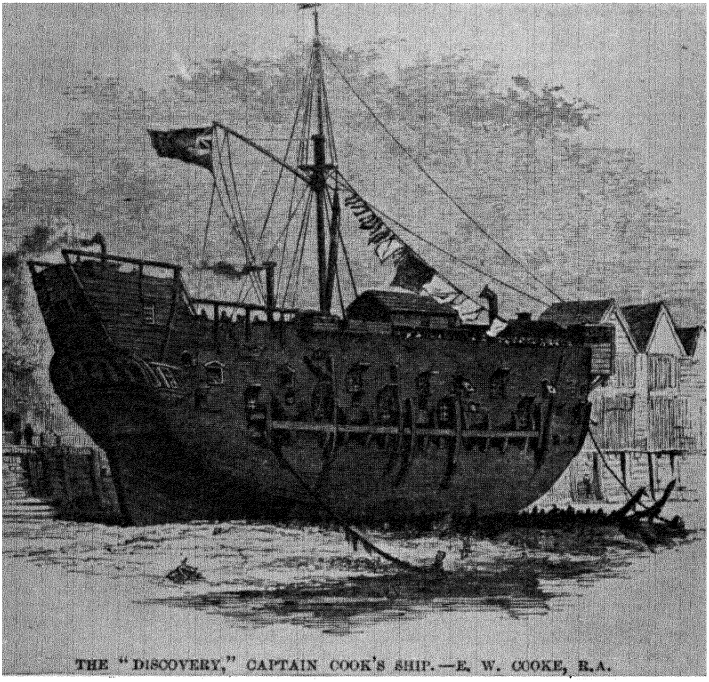
After a defeat of the English at Saratoga, France and Spain joined in the war against England. For a time she lost command of the sea, and another defeat at Yorktown (1781) lost England her colonies, and brought the war to a close. The new British dominion of Canada, however, had remained loyal to her through the war.



N. Dance] [Emery Walker

Captain Cook.

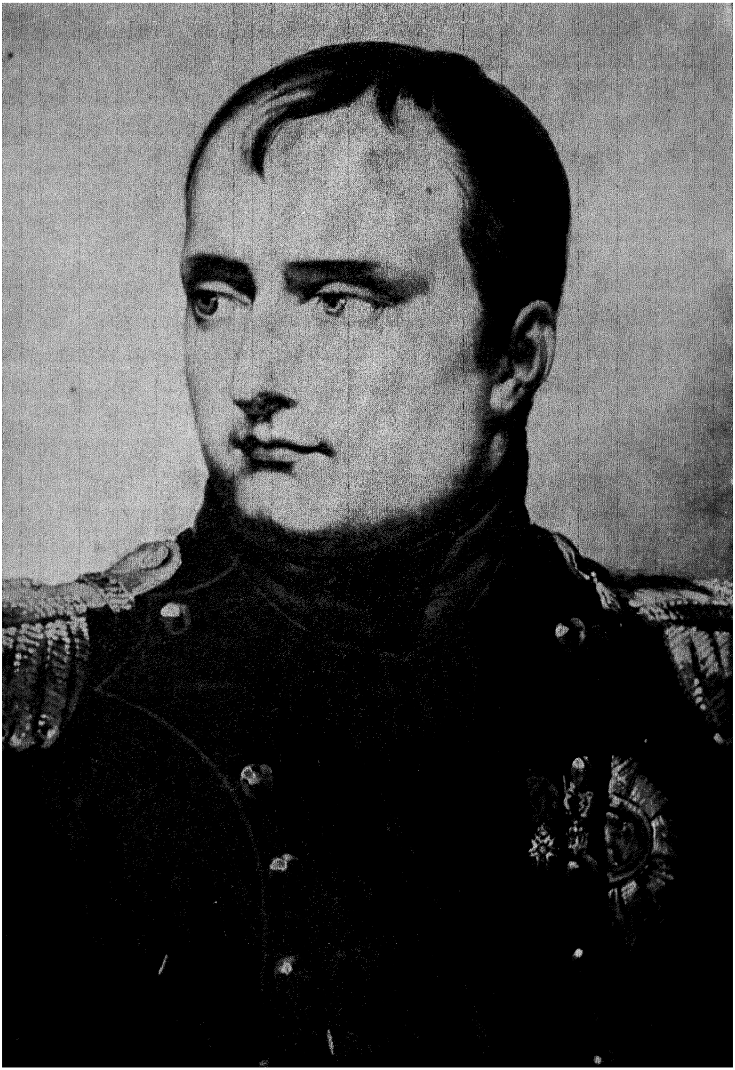
Pitt the Elder (Lord Chatham) died in 1778, pleading for reconciliation with the thirteen colonies, and protesting with his last breath against the dismemberment of the empire he had helped to build. But he did not realise that a new dominion had been opened up, as great as that which had been lost. Between 1768 and 1779 James Cook, Wolfe's scout at Quebec, had made three great


THE "DISCOVERY," CAPTAIN COOK'S SHIP.—E. W. COOKE, R.A.

[Mansell

The "Discovery," Captain Cook's ship.

voyages of exploration in the Pacific. The lands of the Pacific, Australia and New Zealand, which had been discovered by Portuguese and Dutch explorers in the seventeenth century had been almost forgotten ; Captain Cook now claimed them for England, and scientists



[Mansell

Napoleon Bonaparte.

who sailed with him came home full of enthusiasm for their colonisation.

In 1787, therefore, the first English colonists landed at Botany Bay, and the first colony in Australia was established on the site of Sydney in New South Wales.

§ 3

When in 1778 the Marquis de Lafayette led his French volunteers to join George Washington in the American War of Independence, three men were preparing themselves to take leading parts in the greatest scene of European history. For that year Horatio Nelson, a nineteen-year-old lieutentant in the Royal Navy, captured his first "prize" in the West Indies; William Pitt the Younger, an undergraduate at Cambridge, put aside his beloved Greek plays to discuss statesmanship with his father, the great minister, Lord Chatham; and a small Corsican schoolboy, Napoleon Bonaparte, exchanged his breakfast for a hunk of the barrack's black bread because he wanted to get used to eating soldiers' rations.

With the passing of years these three became respectively the greatest sailor, the greatest statesman and the greatest soldier in the world of their day.

When England was losing her American colonies, the ideal of liberty for which Americans were fighting deeply influenced their French allies. Already in France a group of clever writers known as "the philosophers" had been spreading ideas of justice and equality which were eagerly discussed by all classes. With the return of Lafayette's men, who had seen these ideas put into practice, France was quickened from talking into action. There followed the French Revolution (1789 onwards);

and the career of Napoleon —which ended at Waterloo, June 15th, 1815.

Meantime the revolutionary movement had spread to the Spanish Colonies in South America. The name of Simon Bolivar is the greatest among those of the liberators of South America. He was born in the old city of Caracas in Venezuela in 1783, and must have grown up among rumours and tales of revolution and change in Europe. When Spain was weakened by her struggle with Napoleon, the South Americans felt that their time for freedom had come.

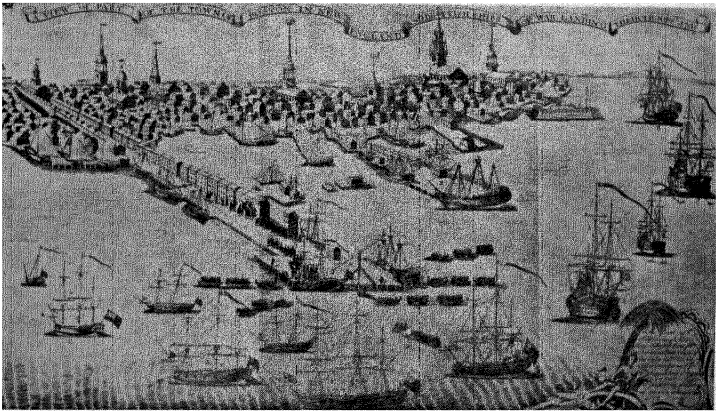
Simon Bolivar led the patriots of his own city in rebellion in 1811; and for a time succeeded in driving the Spanish troops from the city. He was, however, a patriot not only of Venezuela but of all Spanish America; and when he was defeated in one of the states he would make his way to another and win victories for the rebels there. He went to New Granada, back to

[Mansell

This is a picture of an American soldier at the time of the American War of Independence.

Venezuela, to Columbia, of which he was for a time president; and then to Peru which won its independenec in 1825, where he was made dictator. His name is commemorated in the name of one of the states he freed from Spain; for a part of old Peru is now called Bolivia.

Mexico, the greatest of the Spanish dominions in America, held a "National Congress" in 1813; and after a long struggle expelled the Spaniards in 1825: Mexico and the States of South America were now republics.



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British warships landing troops at Boston during the War of American Independence, 1768.

Buenos Ayres and the other colonies in the territory of the great La Plata river won their freedom about the same time; and when Bolivar died in 1831 almost all South America was free from Spain, and the colonies had each become an independent republic.

Chile, the richest and most promising of these colonies, in its struggle for freedom, between 1810 and 1821, had for its leader an English adventurer, Lord Cochrane, who has the reputation of being, after Nelson, the greatest seaman of his time. He commanded the Chilian fleet, and the story is famous of the daring and skill with which he took the Spanish ship *Esmeralda* from under the guns of Callao.

Mexico and the South American republics have had a stormy life for the past hundred years and more. Wars with one another, with Spain, with the United States ; and the revolutions and changes of government within themselves, often bringing fighting and destruction, always insecurity, in their train—have prevented them from being as prosperous as they might have been. But the lands to which the " Indian " chieftain at Panama once pointed the explorer Balboa, " where gold is as plentiful as iron in your country," were the lands of South America, with their vast resources of mineral wealth. To-day men are learning Spanish in all the business centres of the world, to enable them to take a part in the profitable and growing trade with these countries, once the scene of endless disturbances, war and revolutions.

PART II

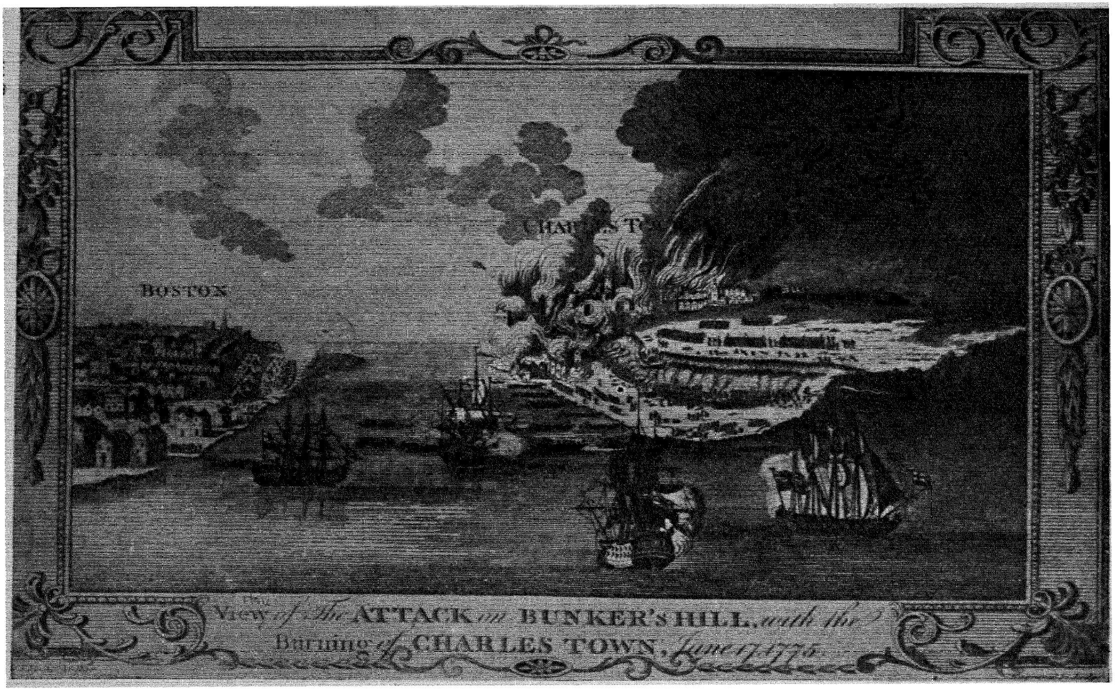
CHAPTER VII

EARLY REFORMERS

Peel, Place, and Others

IN England after Waterloo, and for some fifteen years, conditions were bad for the workers. The war had come to an end and with it the vast expenditure of the Government on all sort of war supplies ; boots and clothing and food for the soldiers, guns and ammunition, and wagons to transport them were no longer called for. Foreign countries were poor after so many years of strife, and trade with them was small. The war had cost England immense sums and heavy taxation helped to cripple trade for a time.

In addition, the great industrial changes, bringing general improvement for most people, disturbed the lives of many and caused suffering which the state, at first, did nothing to soften. Especially after 1820, when the power loom came into more general use, many hand-loom weavers suffered greatly by their loss of employment. The new towns grew up before we knew how to provide proper drainage or regular water supplies for great numbers of people. Thus, as London and other towns of Europe had always been, so the new ones now grew up, filthy, insanitary, and overcrowded.


BOSTON
CHARLES TOWN
The View of The ATTACK on BUNKER'S HILL, with the Burning of CHARLES TOWN, June 17. 1775.

[*Mansell*

A view of the attack on Bunker's Hill, with the burning of Charlestown, June, 17th, 1775.

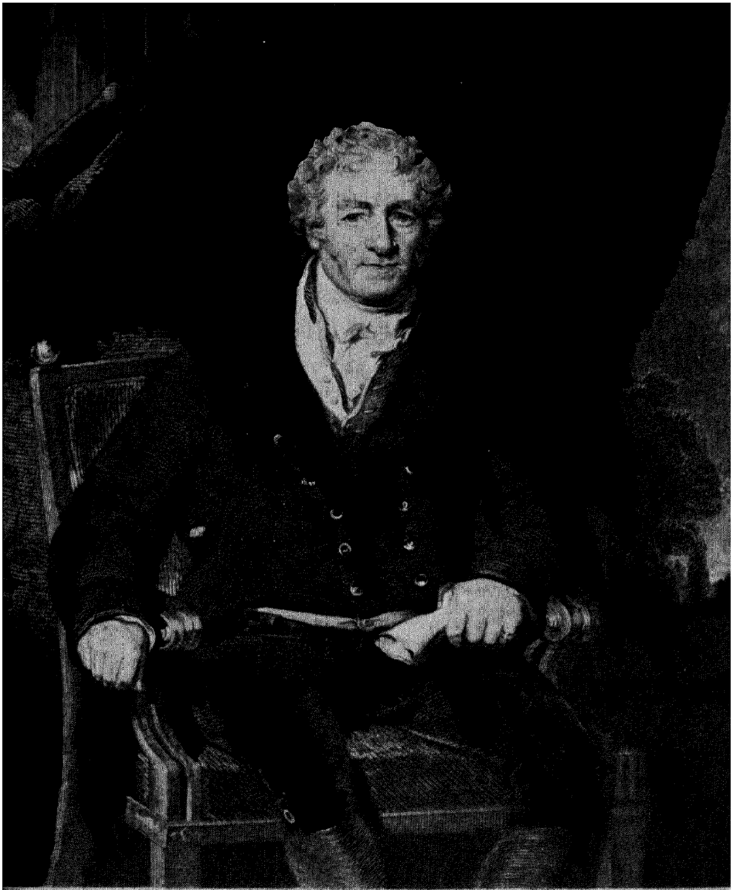
Fever and plague carried off large numbers and it is difficult to realise how any people survived in them.

At a later date, however, as we shall see, towns got power to deal with these things, while engineers and doctors learnt how to make them healthier places to live in and England led the way in showing the value of cleanliness, good water supplies and good sanitation, for the health of town dwellers.

In the meantime, the gathering of men together in factories in town areas, enabled them to talk together, to plan and to combine far better than they had been able to do previously. The scattered domestic workers were quite dependent on the clothier who gave them work. They could not meet together and exchange information about their earnings. The factory workers, however, discontented with the state of things in the new towns, soon began to combine, to hold meetings, and to demand a reform of Parliament. They believed, and quite rightly, that a Parliament of landowners was incapable of dealing wisely or justly with the industrial workers in the towns. Riots broke out, the most serious of which has been called the Manchester Massacre, or Peterloo (1819).

Forty thousand men gathered together in St. Peter's Fields to listen to a violent agitator, Orator Hunt, as he was called. The magistrates arrested Hunt and ordered the soldiers to disperse the crowd. Five people were killed, and over a hundred were wounded, and great indignation was aroused.

The Government, however, was afraid of widespread riots and even rebellion. It still believed that the French Revolution might be imitated in England. It therefore passed several very repressive acts, known as the Six Acts. They forbade drilling, the carrying of arms, and the holding of public meetings ; and they gave extra powers



SIR ROBERT PEEL, BART.

Robert Peel

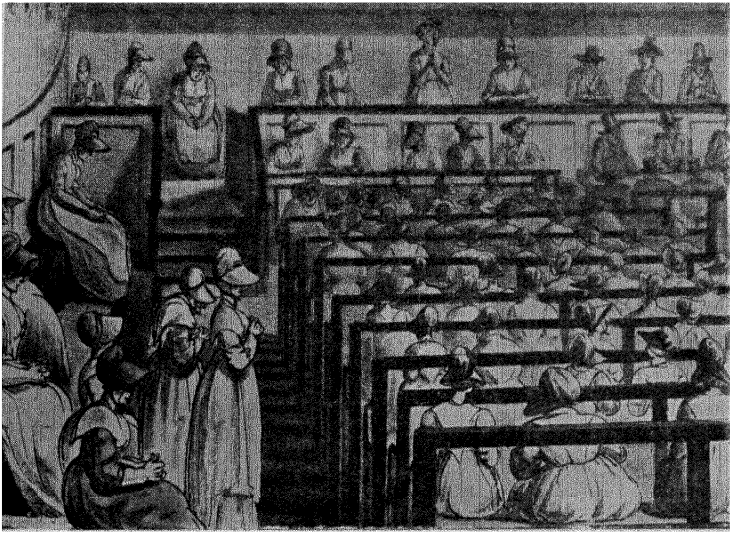
[*Rischgitz*

to the magistrates for the arrest of persons suspected of stirring up rebellion and, at the same time, took away much of the freedom of the press.

So, when George IV succeeded to the throne in 1820, he became King during a time when workers were gathering together to talk over their affairs more than they had ever done before, when the country was still suffering from the effects of the French Revolution and French wars, and when some workers were suffering from loss of employment due to the great industrial changes. It will be understood then, why there was much discontent and why many people were engaging in thinking out reforms or in demanding them.

Sir Robert Peel, following up the work of John Howard and Elizabeth Fry, began with the reform of the law. Peel, like Pitt, had been brought up by his father to be a statesman. When he entered Parliament in 1809 he was only twenty-one, and at twenty-four he had become Chief Secretary for Ireland. It was there that he first set up a new police force, which grew into the Royal Irish Constabulary. The Irish nicknamed the new officers "Bobbies" and "Peelers," after their founder, and the names came to England in 1829 when Peel, as Home Secretary, reorganised the London Police. Until then London at night was guarded only by parish "night-watchmen." They were often old, feeble men ; they kept to their own parishes, and they only moved out of their watch boxes and the warm glow of their braziers twice every hour, leaving fifty out of every sixty minutes free, in which any criminal might do what he liked. The new organisation of well set-up, well-disciplined men soon spread from London to the provinces, and to this day the name "Bobby" has stuck to them throughout England.

Peel also turned his attention to the criminal law, which was still of appalling severity. Men could be hanged for stealing anything from five shillings' worth of goods upwards, or for breaking any form of productive machinery. A man's life was held more lightly than the ownership of a sheep, or the arrangement of a few bits of metal! There were, indeed, some two hundred offences which could be punished by the gallows. Poachers could be transported, and men, women or children thrown into prison for even less serious offences.



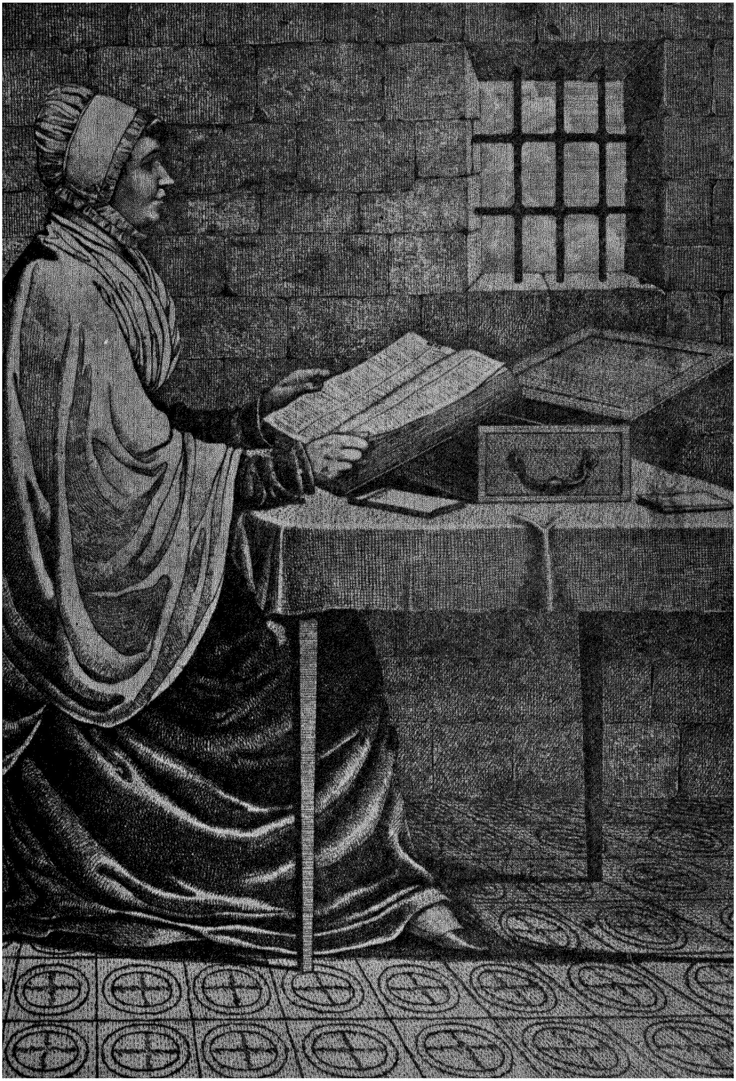
[From "The Microcosm of London"

A Quakers' meeting in the early nineteenth century.

The prisons themselves were dreadful ; dark, terrible places, unventilated, undrained, often with only one common cell where prisoners of all kinds were huddled together. In some there were no bedsteads, nothing but a little dirty straw, on which the prisoners crouched in the gloom, sometimes chained to each other or to the wall by fetters which rubbed horrible sores. All they were given was a little bread and water, though they were allowed to buy more food if they could afford it. Fear, pain and hunger in the evil-smelling darkness turned some into wild animals. Their gaolers never went among them unarmed, but John Howard (1726-1790) a Bedfordshire landowner, and Elizabeth Fry (1780-1845), a gentle Quaker lady, entered the worst prisons alone and without fear. Each spent may years in collecting careful facts of the conditions prevailing. Each told the same tale of cruelty and horror, drinking, fighting, swearing, the injustice and extortions of the gaolers, and the hideously dirty buildings where fever and small-pox were common enough, but infirmaries and baths unknown. Howard, by his book, *The State of the Prisons*, published in 1777, and Mrs. Fry by her great gift for public speaking moved men deeply, yet it was not until 1825 that an Act was passed with the help of Sir Robert Peel, requiring that enough food and clothing should be provided for the prisoners, and that gaols should be kept clean and inspected.

At the same time Peel was improving the criminal law. In a series of five Acts (1823-1827) two hundred and fifty old laws were repealed, making the offences for which people could be imprisoned far fewer, and the length of their imprisonment more in proportion with what they had done, while death was made the penalty for some dozen very serious crimes, instead of, as previously, over two hundred.

Transportation, however, went on. At one time convicts were transported to the American colonies. When the United States won their independence, convict



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Mrs. Elizabeth Fry.

" hulks " came into being, old ships no longer seaworthy, moored at the mouths of rivers. The escape of a convict from one of these hulks is described by Charles Dickens in the opening chapters of *Great Expectations.* Later, convicts were sent to Botany Bay in Australia, but the hulks were still used. Both they and the ships used on the journey to Australia were even more horrible than the prisons, and here again Elizabeth Fry set to work. She concerned herself chiefly with women prisoners, and at last succeeded in getting their men gaolers replaced by matrons, and the prisoners separated into classes according to the kind of offence they had committed. Bibles were given them to read, sewing to help to pass the long days at sea, and a hostel was built in Australia where they could stay until they found work.

Elizabeth Fry pleaded her cause in all quarters. Her work brought her into touch with the lowest and poorest in the land, and with the highest. She was equally at home with them all, as charming on a convict ship or having tea with a poor shoemaker, as when the King of Prussia dined with her. The outcome of her work was the Prison Act of 1865, which drew up a code of rules and enforced it in all prisons.

Humane ideas were spreading generally in the first quarter of the nineteenth century—a sign of the times was the foundation of the Society for the Prevention of Cruelty to Animals in 1824—but many unsatisfactory conditions still prevailed. The workers, who often suffered from them, had no freedom to discuss their difficulties or their grievances, and were not allowed to join together to secure better conditions. The great champion of their cause was Francis Place.

Place was born in London in 1771. His father was a bailiff of the Marshalsea Court, where debtors were tried, and kept a "sponging house," which was the name given to a kind of lodging house for those prisoners who could afford to pay for special "privileges." What such privileges were, and how dreadful a sponging house could be may be read in Charles Dickens's story of *Little Dorrit*, while the kind of landlord Place Senior must have made can be imagined from Francis's own description of him.

"He never spoke to any of his children in the way of conversation, and the boys never ventured to speak to him. If he was coming along a passage or any narrow place such as a doorway, and was met by either me or my brother, he always made a blow at us with his fist for coming in his way. If we attempted to retreat he would make us come forward, and as certainly as we came forward, he would knock us down."

Place's childhood was spent in avoiding this terrible parent, and running the sordid streets of the prison neighbourhood with other boys as uncared for and as wild as himself. It is surprising in the circumstances that he got any schooling at all, and yet he seems to have attended regularly, from the age of four till he was fourteen, such schools as there were for his class. At fourteen he became apprenticed to a leather breeches-maker. For a while he went on living his wild life in the streets, and knew many bad people (one of his friends was afterwards sent to Australia as a convict, another was hanged for murder), but when he was nineteen he married a girl who, though she was younger than he, had a strong character, and from that time he became a steady, industrious workman. Though he worked hard, he earned very little, for the wages of a journeyman tailor were small, and leather breeches were going out of fashion. He and his young wife lived with the first of their fourteen children in one tiny room off the Strand, and had only just enough to keep them alive. Yet it was

[*From the V. & A. Museum, S. Kensington*

An interesting example of a "map" sampler: embroidered in coloured silks, worked by Ann Gardiner, 1792.

then that Place made his great resolves ; one, to make a fortune ; two, to educate himself to the utmost limit of his capacity ; three, to use both fortune and education to help the working class of which he was still one himself. And in all three he at length succeeded.

He borrowed books from a second-hand bookshop, and through a charwoman, who cleaned some lawyers' offices and who borrowed them for him from her employers. In 1793 he helped some other journeymen tailors who had gone on strike against the conditions in which they worked, and organised their small funds so well that they were able to hold out for two months. But in the end they were forced to go back to work without gaining any advance in wages, and Place, because he had been their secretary, could get no work at all.

The next eight months were terrible for him. His baby son died of smallpox, he had to pawn everything he possessed except the clothes he was wearing, and he and his wife were starving. He was even trying to get work as a street scavenger, when at last one day a tailor, for whom he had worked once before, sent for him. Place feared a trap, and would not go, for in those days men could be sent to prison for helping with strikes as he had done. But his wife went off secretly, and came back with her apron full of work. They set to work together, sewing sometimes for eighteen hours a day, until they were able to buy new furniture, and make their one room a home again.

About 1795 things improved still further. Place began to work for private customers, and by buying his materials carefully, and working far into the night to get his orders finished quickly, he did so well that four years later he was able to open a shop at Charing Cross.

His fortune was now in sight, and his education had never stopped. He collected a library in a room behind the shop which became in time the best in London on social and political questions. But he had not forgotten his third vow, or the horrors of the strike. The more he read and the more facts he collected, the more he felt the injustice of the workman's position.

There were laws in England in those days called the Combination Laws, which had been passed during the French wars to prevent workmen from joining together, or combining, to ask for more wages, or even to discuss their work. The law also forbade employers to join together to reduce wages, or control prices, but while between 1799, when the Act was passed, and 1824, when it was repealed, many workmen were convicted and imprisoned, there is no record of one case in which an employer suffered. In the early days this was not surprising, as quite often the magistrates before whom the cases were tried were the very employers concerned. This serious restriction on the rights of working men was due to the fear inspired by the horrors committed in France during the Revolution. Far from stopping meetings and societies, however, the unfair laws increased them. Men met in secret and many learnt to look upon employers as their enemies.

Place, though he did not believe that workmen's unions could do much good, saw how much harm the laws preventing them were doing, and determined to work to get them changed. He began his attack against the Combination Acts by collecting a vast quantity of facts, and writing pamphlets and articles for a weekly paper called *The Gorgon*, through which he interested the little handful of members of Parliament called *Radicals*, particularly Joseph Hume.

Hume decided to move in the House of Commons for a Committee to inquire into the working of the Acts, and Place did everything in his power to make the Committee a success. Letters were sent to the mayors of all

Francis Place
AUTHOR OF "THE PRINCIPLE OF POPULATION".

Rischgitz.

Francis Place.

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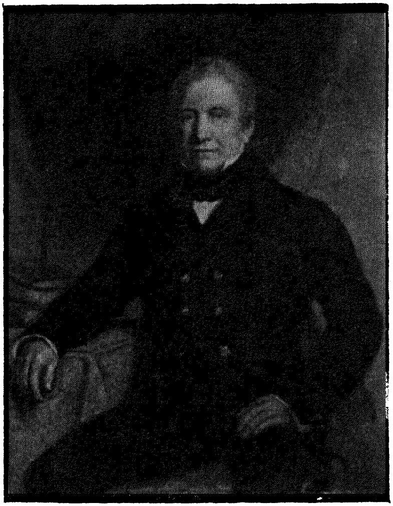


Photo. Mansell] [*After G. P. A. Healy*

Joseph Hume.

the important provincial towns asking them to arrange for both masters and men to send up delegates to give evidence, and when these witnesses got to London, the working men were received and closely questioned by Place, whose library had become a recognised meeting room. He sifted their evidence and arranged it in the most telling way, instructing Hume, who had been made Chairman of the Committee, how to handle each case to the best advantage. In this way he served the men's cause so well that three Bills were passed, doing away with the laws against combination, revising the laws about disputes between masters and workmen, and repealing the law which had forbidden workmen to emigrate, that is, to leave England and make their homes in other countries.

Then a thing happened which Place had not foreseen. In a letter to a friend he had written, "Combinations will soon cease to exist. Men have been kept together only by the oppression of the laws ; these being repealed, combinations will lose the matter which cements them into masses, and they will fall to pieces. All will be as orderly as even a Quaker could desire." Instead, combinations increased rapidly, and, in spite of the advice of Place and Hume, there were so many strikes, and so much violence, that within a year Parliament regretted having done away with the old laws.

In this crisis Place's tactics again saved the situation. Though another Act was passed, through his efforts it still left liberty for the growth of the Trade Unions. These were not at first of any great value, but gradually their importance developed as they became more organised. Twenty to forty years later, between 1843 and 1860, a "New Model" of Trade Unionism grew up, which has done much to educate the workmen to manage their own affairs, has helped them when they were out of work, and helped towards better conditions and regular hours and wages when they were in work.

Place, having gained the repeal of the Combination Laws, began to work again just as hard in the cause of Parliamentary reform, of which we shall see more later. He was not a good speaker, and rather a dull writer, but he was a splendid organiser, and had a clear-sighted way of picking out what was really important in the mass of facts and figures he collected for other people. That is one of the most attractive things about him; he was always content to work for other people, as he had for Hume, staying in the background himself and not caring who got the praise for success as long as it was achieved. He worked without thought of personal gain; indeed, as by the time the Combination Laws were repealed he had long been himself a master tailor employing a number of journeymen, his efforts to help working people might easily have proved to his disadvantage. He died at the age of eighty-two in his house at Hammersmith, having kept the three resolves he made in the little bare room off the Strand.

At the same time William Huskisson, President of the

Board of Trade, supported by Peel, had continued Pitt's early policy of taking the wind out of the sails of the smugglers and increasing commerce by reducing customs duties. Sugar, cottons and woollens, iron, linens and silks all benefited.

The worst effects of the French wars had now passed away. There were also several years of good harvests and food was cheaper, while the new industrial methods were making many things which had been luxuries cheap and plentiful enough for larger numbers of people to enjoy them than had before been possible.

Both England and the Colonies benefited by Huskisson's work, as trade was made freer and goods coming from our own Dominions paid less than those from foreign countries.

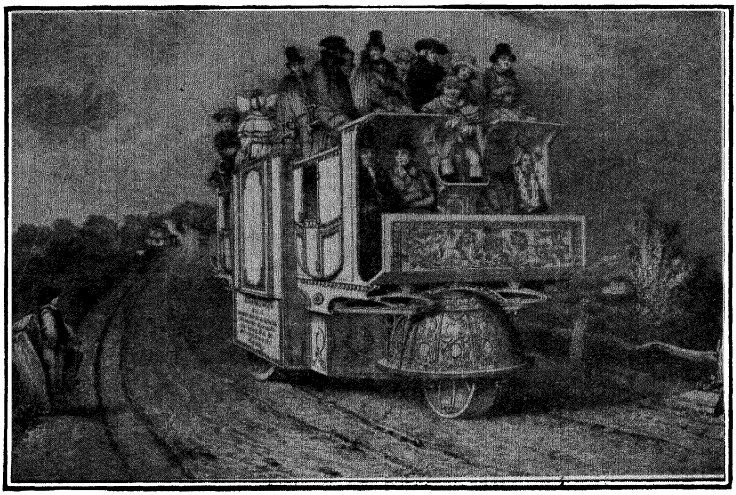
CHAPTER VIII

THE ADVANCE OF STEAM

Stephenson and the Railways

As we have seen, the great mechanical inventions immensely increased *production*, and neither canals nor improved roads sufficed to carry the great streams of raw materials and goods flowing to and from the factories. Coal could only be sent from the mines to the foundries and factories slowly and in small quantities ; iron and building materials for the growing towns crept about the country laboriously in barges and creaking carts, and all the new manufactured goods took a long time to get from the makers to the users both in England and abroad. So it is natural that many men in the early nineteenth century began to study ways of using steam-power to increase the speed of wagons and boats.

They succeeded first with boats. A Scotsman, Symington, finished a little steam tug, the *Charlotte Dundas*, in 1803, and launched her on the Forth and Clyde Canal. Prejudice was against her and she was not much used, but five years later an American, Robert Fulton, was inspired by her to build a much better boat, the *Clermont*, which was fitted with a Boulton-Watt engine adapted for " marine use." Though " marine " means "of the sea," the *Clermont* never put to sea, but she ran regularly on the river Hudson between New



ABOVE.—*An old steam carriage.* BELOW.—*The latest type of long-distance omnibus.*

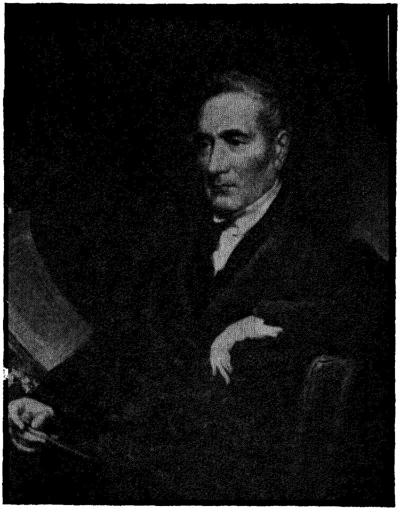
York and Albany, and was the first steamboat in the world to carry passengers.

England soon followed suit, and Bell's little steamer, the *Comet*, appeared on the Clyde in 1812, plying from Glasgow to Helensburgh, and carrying passengers as well as "parcels." For the cargo she could manage was so small that to-day it would seem scarcely more than parcels.

Steam was tried soon after for sea-going vessels. These vessels, however, only ventured upon the "narrow sea." In 1816 one crossed from Brighton to Havre, and in 1820 another from Holyhead to Dublin, on which route the first regular seagoing steam service was established.

Meanwhile the use of steam for transport had also been progressing on land. William Murdock, Watt's clever foreman, made the first model of a travelling steam engine, but it needed much improvement to make it of practical use. There is a story that one night while he was experimenting with it on a quiet road it ran away from him and nearly frightened the Vicar of Redruth to death, clattering at the poor man out of the darkness in a cloud of flying sparks!

Yet "railways" in the literal meaning of the word, had existed as early as 1630. These were wooden rails let into the ground in many of the coal-working districts to make it easier for the heavy carts to be drawn along the very bad roads. By 1676 quite a number of these wooden railways were in use, and a century later they were gradually replaced by iron rails, more carefully laid on levelled ground. Wagons were made with a rim round the inner edges of their wheels to hold them on the rails and in some places *stationary* steam engines were used to draw them up slopes by winding in a rope or chain round a drum.



[Rischgitz

George Stephenson.
A Pioneer of Railway Development.

In 1804 a Cornish inventor called Richard Trevithick adapted Watt's engine to a locomotive that would run along the road; a few years later William Hedley further improved on this and produced the famous "Puffing Billy," which could stagger along the iron rails, but at first could only draw one truck. So it was left to George Stephenson to become the real "father of the railway." ("Puffing Billy" can still be seen in the Patents Office in London.)

George Stephenson was born in 1781. His father was the fireman of one of the old Newcomen engines at Wylam Colliery near Newcastle-on-Tyne. There were six children living with their parents in a tiny one-roomed cottage, "an honest family, but sair doon i' the world." George, the second son, was sent to work at six years old, herding cows for twopence a day. It is said that even then engines had caught his imagination and he used to make little mud models of the one his father helped to work while he minded the cows in the fields.

By the time he was twelve George was doing heavy farm work, even carting and ploughing, which he was very proud of being strong enough to do, but his real ambition was to get taken on at the coal pit to help his father with the engine. When he was fourteen this at last happened ; he became an assistant fireman or stoker with wages of six shillings a week. There were no free schools in those days and the Stephensons were too poor to pay for his education, so, though when he reached the age of seventeen George knew all he could possibly find out from experience about engines, he could neither read nor write. He saw how much this was going to hamper him, and he determined to learn. The family by this time had moved to Jolly's Close where there was a new mine at which George and his father were enginemen. From there George, after a long day's work, used to walk in to a night school at Walbottle, where he learnt to read and sign his name. He then set himself to study mathematics. Very soon, when he took his engine to pieces, he began to see not only *how* it worked but *why*, and then he started trying to think out ways of improving it.

In 1802 Stephenson became brakesman at Black Callerton, left home, and took lodgings with a small farmer. There he fell in love with the farmer's servant girl, Fanny Henderson. To make enough money to marry her he learnt cobbling, at which he worked far into the night after he left the pits, and so saved up his first golden guinea. Soon after they were married Stephenson got a better post at Willington Quay, but poor Fanny was delicate and within two years she died, leaving one little son, Robert, who was to become almost as famous as his father.

Just after her death, Stephenson, who had fallen into a state of deep grief, was asked to go to Montrose in Scotland to look after a Boulton-Watt engine which was being fitted in a spinning factory there. He roused himself, and, too poor to travel any other way, he walked the whole distance, did the job, and walked back again to his father's house where he had left his baby son.

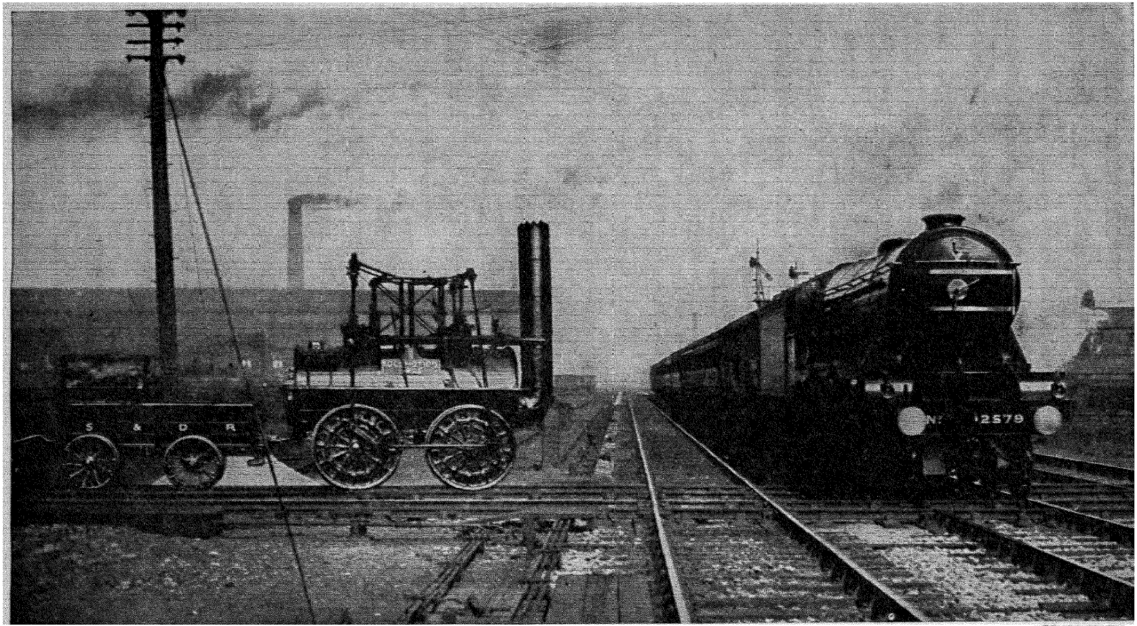
His next post was as brakesman at Killingworth Colliery, where his big chance came to him at last, just as it had to Watt years before, through the failings of a Newcomen engine. The engine went on strike. All the enginemen in the neighbourhood tried to make it work but had to admit themselves "clean beat." Then Stephenson tried, and, like the youngest son in fairy stories, he put everything right, and not only made the engine run but also improved it so much that he was given a reward of ten pounds and made head engineman of a new pit. From then on his fame as an "engine doctor" spread, and in 1812 he became engine-wright of the whole colliery at a salary of £100 a year.

It was then that he persuaded Lord Ravensworth, the senior partner of the Killingworth Colliery, to advance him enough money to build a moving engine, or locomotive. In a year he succeeded in making the Blucher (called after the famous Prussian general who fought with Wellington at Waterloo). This engine was on somewhat the same lines as Hedley's "Puffing Billy," but so much better that it could draw eight trucks containing thirty tons of coal along the level and even up slight grades at a speed of about nine miles an hour.

Though this was regarded as a great success, few people outside the colliery district heard of it, and apparently no one there thought of helping Stephenson with money to make more experiments. It was not until 1821, when he obtained the post of chief engineer on a new "railway" at first intended for horse drawn cars between Stockton and Darlington, that he built his second engine.

When Stephenson applied for this post he described himself as "only the engine-wright at Killingworth," but Edward Pease, the chief director, thought he had "such an honest, sensible look," and was "so modest and unpretending," that he gave him the job. Stephenson at once urged the use of steam instead of horse traction, and, after Pease had been to Killingworth and seen the Blücher at work, he agreed, and Stephenson was able to construct not only the line but also "The Locomotion." This engine hauled a train made up of six wagons loaded with coal and flour, a coach for the directors and their friends, twenty-one passenger wagons, and six more goods wagons, at a speed of twelve miles an hour. The importance of this event has been overshadowed by Stephenson's crowning triumph on the Manchester-Liverpool Railway which was constructed immediately afterwards.

Since the opening of the canal built by the Duke of Bridgewater and Brindley between these towns, trade had grown so much that the waterway was overcrowded with barges, which could only move very slowly, held up by continual delays at the locks, while on the quays, goods were piled high waiting for transport. So, although the canal authorities, and indeed many other people, bitterly opposed the idea of a railway, Parliament, after much debate, passed a Bill permitting it, and Stephenson set to work. He had to overcome many difficulties in laying the line, the chief of which was Chat Moss, a great bog which most people said would swallow up his rails as fast as he put them down. But Stephenson constructed a *floating-road* to carry his railway, supported by a huge embankment of compressed peat dug from the bog itself. The story of this road, the effort and experiments, the heart-rending failures and new beginnings, would



Courtesy] [L.N.E.R.

A Century of Progress.

*A composite photograph showing "Locomotion" No. 1, the first locomotive ever made for a public railway, standing upon the same track along which it hauled the first passenger train on 27th September, 1825, and "**The Flying Scotsman**" of to-day crossing the old line at Darlington.*

fill a long chapter by itself. Stephenson never lost faith or courage, and in the end he conquered Chat Moss and all the other difficulties of the line.

The directors then offered a prize of £500 for the best locomotive to draw the trains, and Stephenson, with his son Robert, began to build the "Rocket." Robert had been to a good school in Newcastle, and for six months to Edinburgh University. He knew more of chemistry and physics than his father, and had as good a brain, yet in the building of the "Rocket" it was still George Stephenson who took the lead, and Robert's genius was to show itself later in bridge-building.

Two other engines were entered for the prize, the "Novelty" and the "Sans Pareil." The competition was held in 1829 and Stephenson's "Rocket" won, going at a speed of twenty-nine miles an hour. The "Sans Pareil" only went a seventeen-and-a-half miles an hour, but it was a good engine and was used afterwards on the railway. The "Novelty" reached thirty-two miles an hour but it blew itself up in doing it and had to be withdrawn. The line was formally opened in November, 1830, and many famous men were present, including the Duke of Wellington, then Prime Minister, and Sir Robert Peel. For twenty years George Stephenson had struggled to make people realise the power and importance of the locomotive. This was the hour of his triumph, when his engine, the "Rocket," drew carriages full of directors, engineers, politicians and their friends along the line he had constructed. It was the beginning of the great railway system that to-day covers Britain with a network of steel.

In the next fifteen years Stephenson was one of the busiest men in England. He was chief engineer on the Grand Junction Line between Birmingham and Manchester and on the lines between Manchester and Leeds, Birmingham and Derby, Normanton and York, and Sheffield and Rotherham. He became a wealthy man but he was not spoiled by success. Remembering his early struggles, he did all he could to found and support schools and institutions to help workmen and their sons. Though he was offered honours and titles he would not accept them and remained to the end of his life simply George Stephenson. He died at Tapton House, near Chesterfield, in August, 1848, having laid the firm foundation of the London and North Western Railway, in the great London terminus of which, Euston, stands his statue, and one of his son Robert.

CHAPTER IX

A NEW DISCOVERY

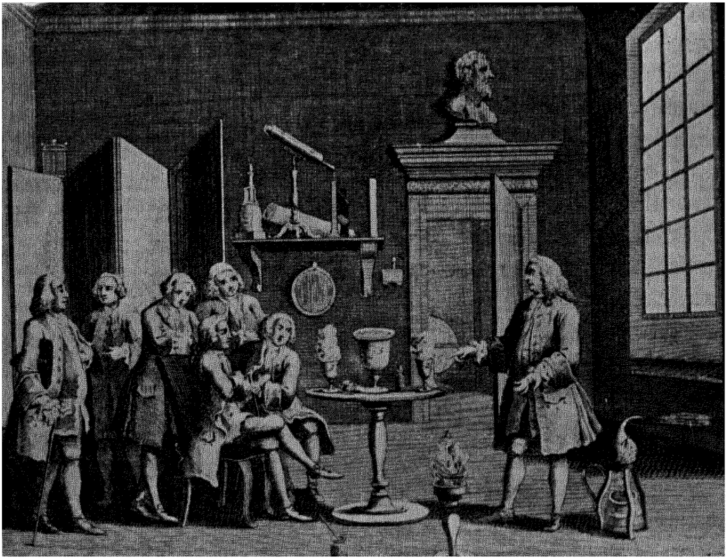
The Great Electrical Engineers

THE story of electricity began over two thousand years ago, when men learnt two things which for a long time remained unconnected. The first was that when amber is rubbed it will attract light bodies and lift them as a magnet lifts a pin, the second was the discovery of the lodestone or " leading stone."

About this discovery there are many legends. Some tell of a shepherd boy who suddenly found one day that the iron shod end of his crook was sticking to a strange black stone ; others of a man with iron studs in his sandals to which small pieces of the lodestone clung so that he found difficulty in walking and stopped to examine the substance. But all the stories agree that the lodestone, which is a certain kind of iron ore, was first found in a part of Asia Minor called Magnesia, and that is how the magnet gets its name.

From these simple beginnings have descended all electrical discoveries down to the X-rays, the wireless, and the electric light and power of to-day.

The story of the great electrical engineers begins with Luigi Galvani. He was born at Bologna in 1757, and he wanted as a young man to be a monk. He studied theology and was about to enter the church when his friends persuaded him to turn instead to medicine. In 1762 he was practising as a doctor and wrote a very clever paper on how bones are built up and fitted together, which led to his being made professor of anatomy at the Institute of Bologna. It was there that he made the discovery through which he became famous. Like many discoveries, it was quite accidental. Galvani himself wrote:



[From a contemporary print in the V. & A. Museum, S. Kensington

Chemical demonstrations to an interested eighteenth century audience —about 1740.

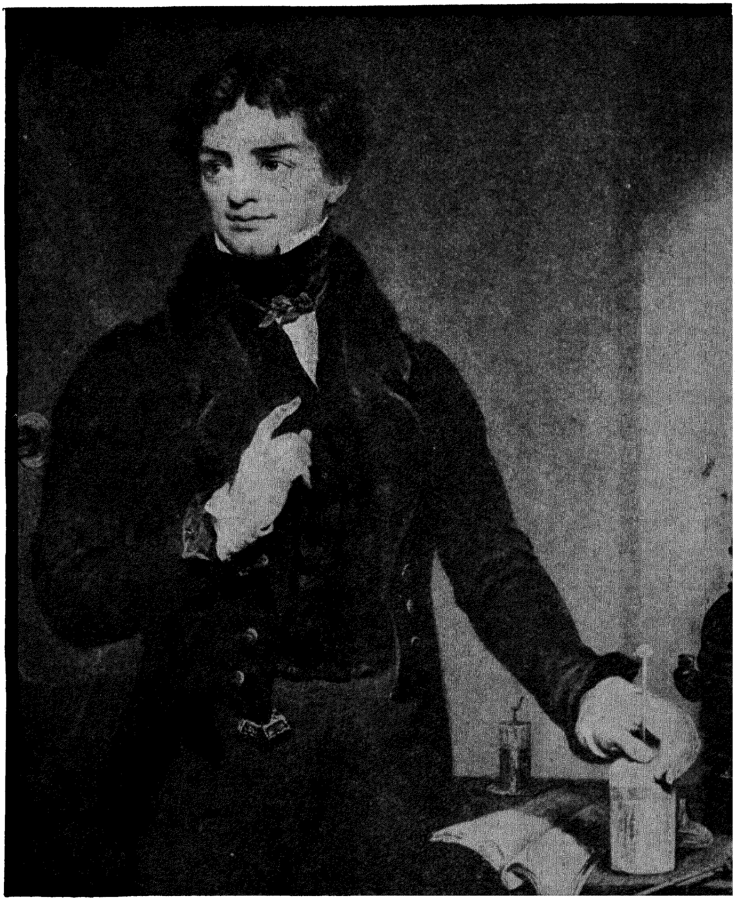
"I had dissected and prepared a frog, and laid it in a table, on which, at some distance from the frog, was an electrical machine. It happened that by chance one of my assistants touched the frog with a scalpel, where-upon at once the muscles of the limbs were violently convulsed."

Excited by this mystery of a dead frog's leg kicking, Galvani made several experiments. He put frogs' legs on a copper hook, and hung them on the iron balcony of his home during a thunderstorm to see if the same thing would happen through the electricity in the atmosphere. It did. The dead legs jerked and twitched not only during the storm but in perfectly calm weather. His wife, who was also his only friend, for he was a shy, sad man, and avoided all society, is said to have helped him in these experiments.

The theory Galvani worked out was that electricity from the air must have been slowly stored in the frog and then let loose when the copper hook touched the iron bars of the balcony, making the legs dance. But another Italian, Volta, had quite a different idea.

Alessandro Volta's first love had been literature, and as a young man he journeyed to Switzerland to meet the great French writer Voltaire; but at the time of Galvani's discovery he had become professor of natural philosophy at the University of Pavia, and had already made many experiments and written much about electricity himself. His idea about the frog was that the electricity came not from the animal but from the two different moistened metals of the copper hook and iron railing touching each other. This, he said, produced a current which ran through the legs giving them an electric shock.

He proved that he was right by making a pile of different metal discs, copper and zinc, and using, instead of the moist frog's flesh, cloth damped in acid water, which made an electric current flow along a wire just as it had flowed along Galvani's hook into the frog.



[Mansell

Michael Faraday.

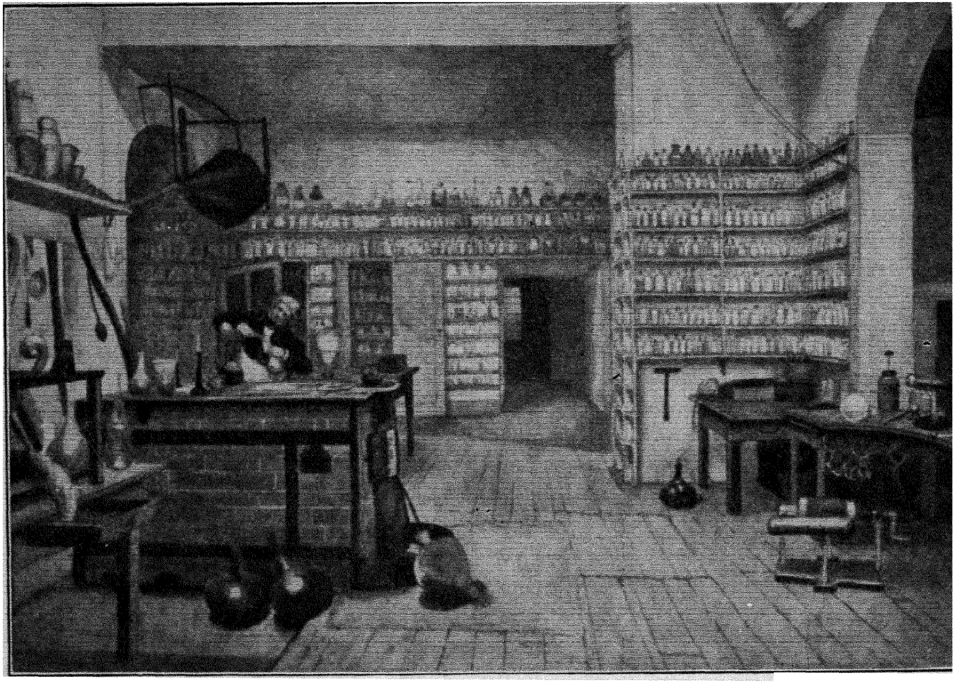
The next step from this pile with its damp cloths was putting the two metals with their conducting wire straight into acid water; an easy step, probably suggested by the cloths drying quickly and stopping the current. In doing this, Volta made the first electric battery.

Galvani did not live to see the battery which grew from his discovery. He had been sent away from the Institute where he worked because he refused to take oaths to the Cis-Alpine Republic, and he died in the country two years before Volta's invention.

Volta's work was eagerly studied in England by Sir Humphry Davy, a Cornishman who invented the miners' safety lamp. Davy as a boy had been placed with a surgeon and apothecary who wrote of him as "idle and incorrigible," yet he became a great analytical chemist and a brilliant lecturer.

To his lectures came a young man, Michael Faraday, the son of a humble family in Newington Butts, who had apprenticed him to a bookbinder. All his spare time young Michael spent in experimenting with every type of machinery, and when he heard of the new discoveries in electricity he made electrical models as well. A friend of his master's, on seeing these, realised that Faraday had an exceptional brain and first took him to hear Davy. Later, they met, and Davy, finding that Faraday had not only a brain but also a very attractive personality, made him his secretary and assistant. For three years Faraday travelled with Davy and then became a lecturer in chemistry himself and was afterwards appointed to the Royal Military Academy at Woolwich.

Davy had already discovered that compounds such as water could be split up into their separate chemical elements by passing Volta's current through them, and a Danish professor, Hans Christian Oersted, had in 1820



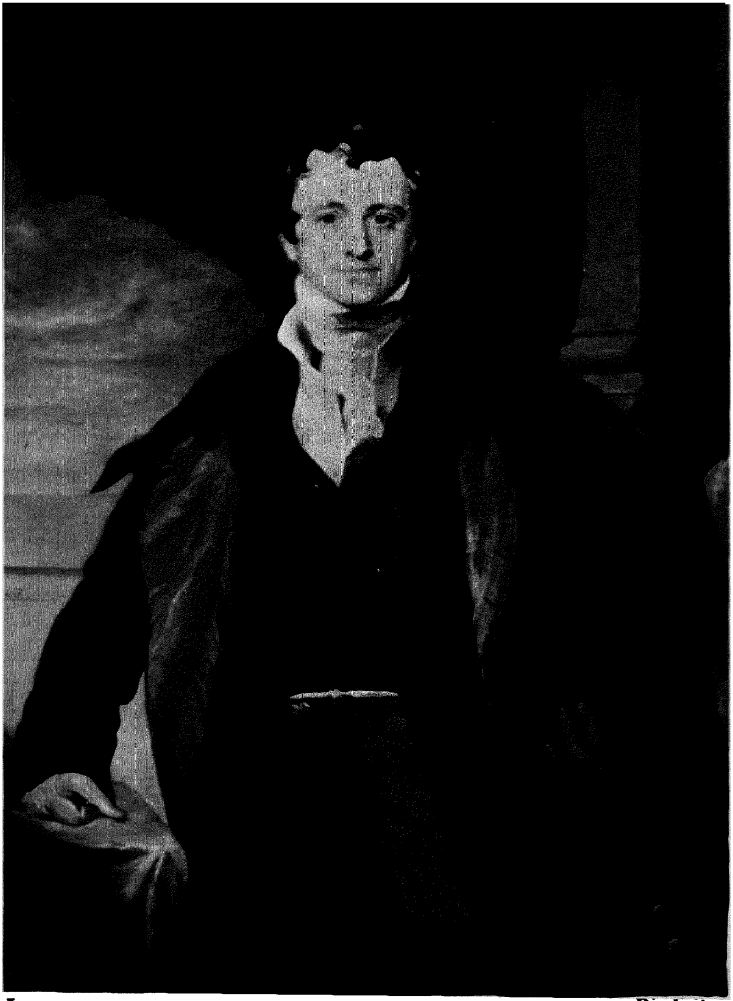
Courtesy] [Royal Institution

Faraday at work in his laboratory.

discovered a close connection between electricity and magnetism, which was the very beginning of the telegraph. But in 1831 Faraday, by then first professor of chemistry at the Royal Institution, made a still more important discovery. He found that an electric current could be produced by a coil of wire moving near a magnet. This was the beginning of the dynamo, in which coils of wire are revolved between the poles of magnets and the current led out to use as heat, light and power. Faraday's dynamo was hardly more than a toy, and its tiny coil was turned by hand like a sewing machine, but to-day its first cousins, turned by steam power or water power, light great cities, drive machinery in factories, and in countless homes run vacuum cleaners and electric fires, toasters, ironing and washing machinery, and many other domestic appliances. Naturally, where water power can be used, in countries like Norway, where there are many falls and swift streams, the smallest cottages are often supplied with electric lighting.

Faraday also made the electric motor, which is exactly the reverse of the dynamo. Instead of supplying power to revolve the coil and produce a current, the current is led to a stationary coil and makes it turn, giving mechanical motion in return for electricity instead of electricity in return for mechanical motion.

Next Faraday went a step further in his knowledge of what is called electro-magnetic induction. He found that the current produced by one coil and battery would pass to another coil without a battery and for a moment produce electricity from it. If the current ran on steadily the second coil stopped producing, but by switching the current on and off and increasing the number of turns of wire in the second coil he showed that very high



voltages could be attained. Telephones (and the earliest attempts at wireless telegraphy) depend on this discovery, as we shall see in a later chapter.

Faraday received many honours both in England and abroad for his great work. In 1835 he was granted a state pension of £300 a year, which meant much more in those days than the same sum would mean now, and in 1858 he was given a fine house at Hampton Court. But he remained always a simple-mannered and charming person, and when he died in 1867 people felt the loss of Faraday the man, as much as Faraday the inventor.

PART III

CHAPTER X

THE BATTLE OF THE REFORM BILL AND THE WELFARE OF THE WORKER

WE have seen that as soon as he had succeeded in getting the Combination Acts repealed, Francis Place began to work for Parliamentary reform.

Iron and steam brought into being a new class in England, no less important in their way than the great landlords in the shires. These were the owners of factories and mills and mines, the heads of trading houses, companies, broker firms and banks. These men had won their success by their own efforts and were discontented at having no voice in the country's government.

The little market boroughs of the south and east which had sometimes dwindled down to a mere handful of people still returned either one or two members, while, as we saw in a previous chapter, towns such as Birmingham and Manchester had no representatives in Parliament.

Agitations for reform were widespread and when the Whigs came into office under Lord Grey a Reform Bill was introduced.

This Bill proposed that every householder whose holding was rated as worth £10 a year should be given the vote, and that the entire distribution of Parliamentary seats should be reorganised. It was a sweeping measure, that staggered the Tories when Lord John Russell introduced it in the House of Commons on March 1st, 1831. Lord John was a very little man, young, carefully dressed and possessed of a singular power of cool, direct speech. As he read the long list of the boroughs which would lose their members jeering laughter came from the men who held the seats selected for extinction. When he finished, the Tory bombardment broke. Peel himself opposed the Bill, but in spite of all protests it came up for second reading. The house was crowded to overflowing, and when it was put to the vote "the Ayes and Noes were like two volleys of cannon . . . you might have heard a pin drop when Duncannon read the numbers. Then again the shouts broke out and many of us shed tears. And the jaw of Peel fell, and the face of Twiss was as the face of a lost soul; and Herries looked like Judas taking off his necktie for the last operation. . . ." All three were

[From the "Book of Trades," 1815

The nineteenth century lady milliner at her work.

Tories; the Bill had passed by a Whig majority of one vote.

But it was wrecked by an amendment brought in when it was gone through clause by clause before the final reading. Grey resigned and Parliament was dissolved.

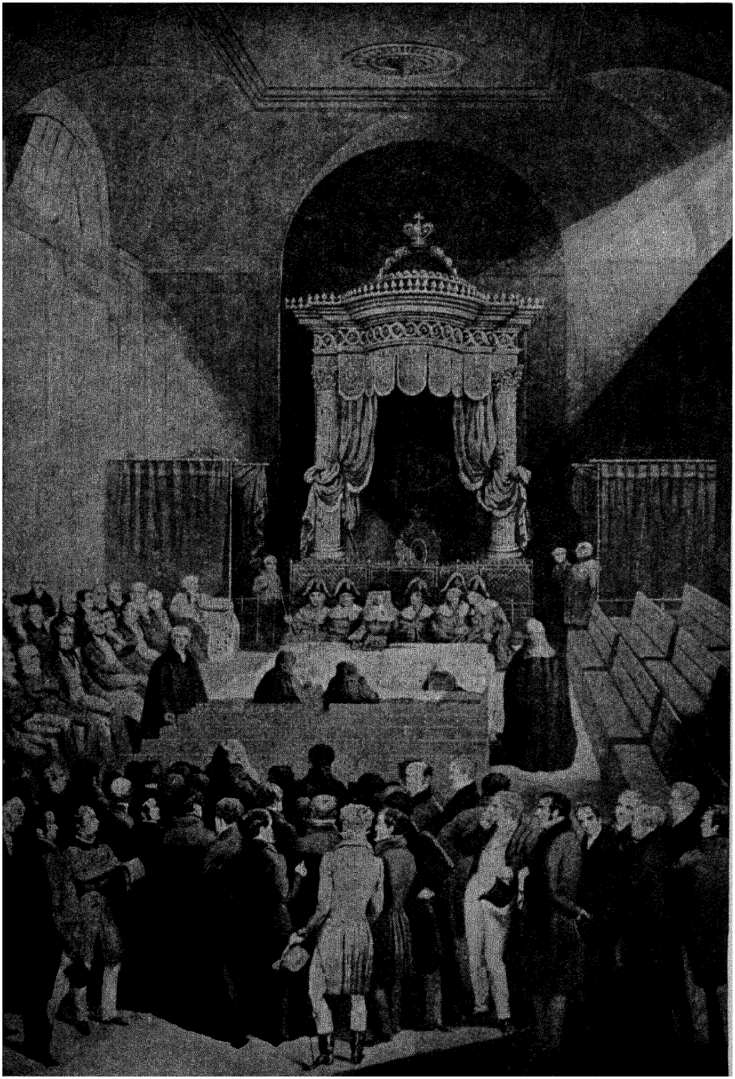
The country was boiling over with excitement. From the biggest capitalist to the humblest clerk the middle class stood solid for the Whigs. Tory candidates were hooted and guys made like them were burnt; tenants voted Whig in flat defiance to landlords and the Whigs were returned to Parliament with a clear majority of 136. Still the Tories kept up their opposition, attempting to destroy or amend every clause, but at last the third reading of the Bill was passed.

But in the House of Lords it was a different tale, for the Tory element was not merely strong, it was overwhelming. Led by the Duke of Wellington they remained deaf to all arguments and threw out the Bill.

There is probably no moment in modern history when England was so near civil war without coming to it as in the weeks which followed. Tory members went in danger of their lives. Wetherell, the member for Bristol, who had opposed the Bill on all occasions, had to flee from his constituency over the housetops. A meeting of a hundred thousand people took place at Birmingham to protest against the action of the Lords. Workmen's associations began to arm and drill.

Grey determined to give the Peers a chance to retrieve their blunder. The Bill was put to them again, with small alterations here and there to please them. The Lords, however, did not change their minds; they voted against the Bill again, and once more Grey resigned.

The King sent for Wellington; the country held its



[*After the painting by W. S. Reynolds*

The Reform Bill of 1832 receiving the Royal Assent.

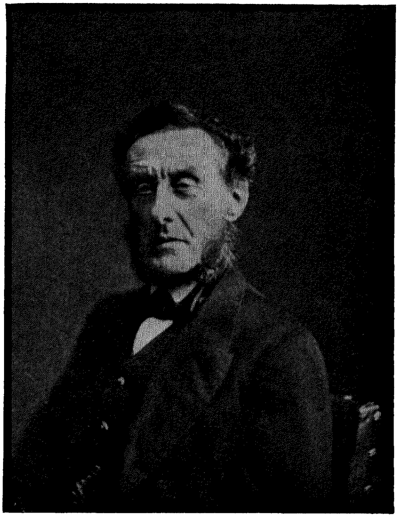
breath. If he had become Prime Minister London and the big towns would simultaneously have risen. But the Duke was unable to form a ministry. Then at last King William IV yielded to Grey's demand that he should be willing to create new Peers to get the Bill through the Upper House, and under this threat the Tories gave way. On June 4th, 1832, the Bill was passed and the very schoolchildren rushed round their playgrounds shouting "The Bill is passed, the Reform Bill's passed." So ended the great duel between the Peers and the People, just as the duel ended between Sydney Smith's Mrs. Partington and the Atlantic Ocean which she tried to sweep back with her mop.

"The Atlantic was roused. Mrs. Partington's spirit was up. But I need not tell you the contest was unequal. . . . The Atlantic beat Mrs. Partington."

This Reform Act did not directly affect the wage-earners, but it made a start and led the way for later Reform Acts which did so.

In the next four years, the Whig Government, which passed the Reform Bill, also passed the first really successful Factory Act. It also abolished negro slavery in our colonies, and by its Poor Law Act brought back health to English agriculture and self-respect and independence to the agricultural labourer. Finally, it gave elected councils and the chance of good government to all the large towns.

The first of these Acts was the Factory Act of 1833, and the moving spirit of it was Antony Ashley Cooper, Earl of Shaftesbury. His childhood had not been happy, for his father was engrossed in public affairs, his mother in society pleasures. His three sisters were older than he; he was a lonely little boy whose only friend was an old housekeeper. Perhaps from this early unhappiness he learnt the tenderness towards all others who were unhappy which he showed throughout his life. He was always the friend of the poor and the oppressed, and when the squalid misery of factory conditions was brought to his notice by Michael Sadler's Ten Hours Bill in 1832, he immediately championed their cause. The Bill was rejected and Sadler lost his seat, but Lord Ashley, as he was then, worked on.



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7th Earl of Shaftesbury.
Who made valiant efforts to alleviate the tragedy of child labour.

He took endless pains to learn the facts first hand, visiting factories, mills and mines until his "slender and extremely graceful figure, curling dark hair and features delicately cut," came to be known down the pits and in the workrooms, and among the poorest homes and filthiest lodging houses of the slums.

A terrible state of things was disclosed. Pauper children from London were being sent in coachloads to factories in Lancashire and Cheshire, where they worked fifteen and sixteen hours at a stretch. They were sometimes given poor food, and usually had to sleep in sheds, or even in the factories, among the machines. The parishes from which they came seldom made any inquiry about them, only caring that the children no longer had to be supported out of the rates. Few of their masters minded what happened to them—such labour could always be replaced, the supply was plentiful. Other non-pauper children from the age of five upwards worked thirteen hours a day beside their parents in the mills, for a shilling a week. Many who lived grew up crippled or twisted.

Lord Ashley, caring nothing for party politics in such a case (both he and Sadler were Tories), enlisted the help of Lord Althorp, the Whig leader of the House of Commons, and in 1833 carried a Bill which forbade the employment of children under nine, limited the working day of those under thirteen to eight hours and of those under eighteen to twelve hours, stopped night work for children, and appointed inspectors. Unfortunately this Act only applied to the textile factories.

The Act for the Abolition of Slavery was passed in the same year. Wilberforce had worked steadily for this ever since the days when he and Pitt passed the first measure to supervise the slave-ships. He had formed the Anti-Slavery Association and though, in the last stages of the long battle, he was too old a man to take an active part, it was his work which inspired Edward Stanley, who carried the Bill through. He met with much opposition, one of his chief opponents being William Gladstone, a young man just up from a distinguished career at Oxford, who sat for the Duke of Newcastle's "rotten" borough of Newark. Gladstone spoke with eloquence for fifty minutes against the Bill ; his father owned plantations and 1609 slaves. But the Bill was passed and the elder Mr. Gladstone received £75,000 in compensation for the freeing of his slaves. England altogether paid out the immense sum of twenty million pounds that there might be none but free men within her Empire. It was perhaps one of the most generous

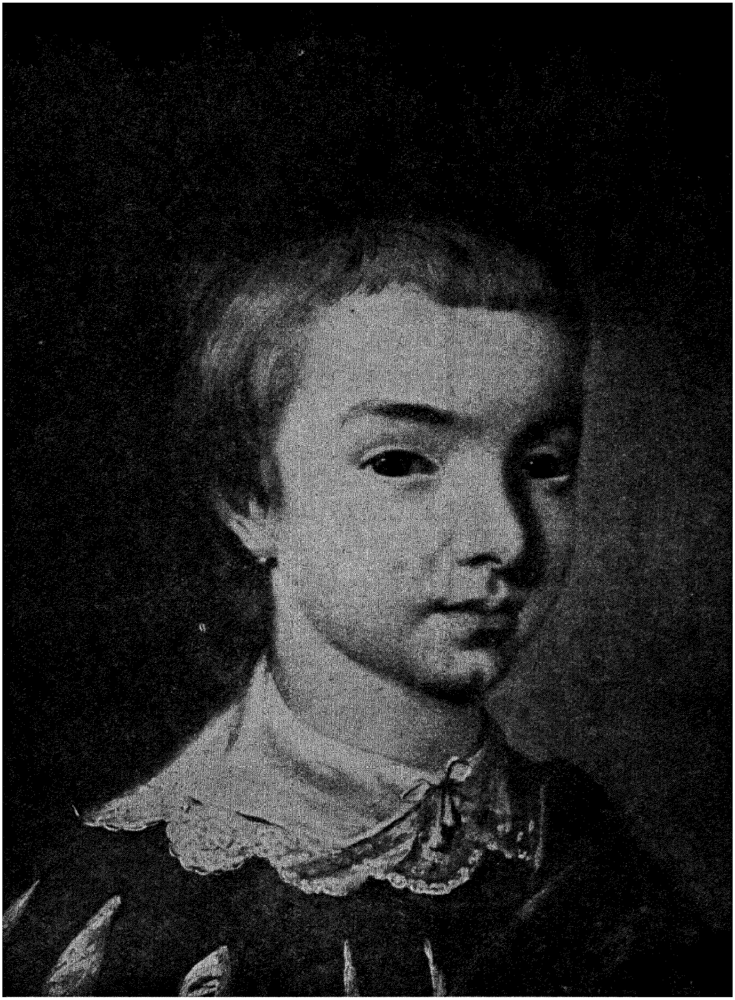


Photo. Mansell] [*J. Russell*

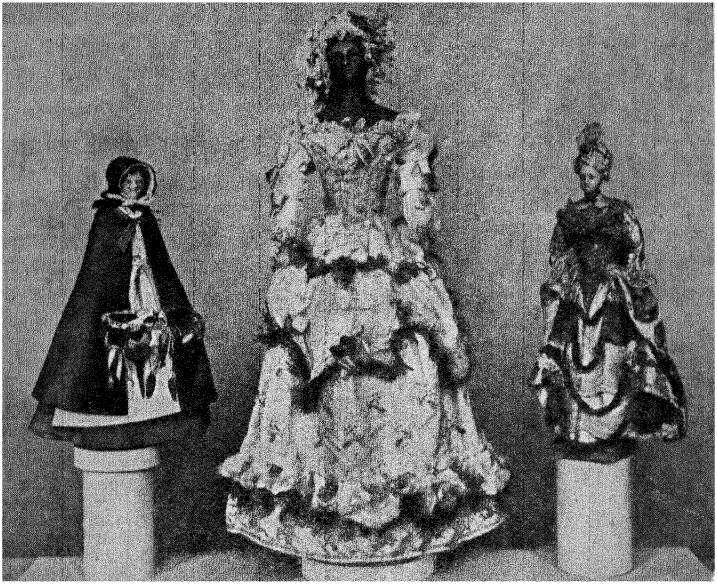
Young William Wilberforce.

and disinterested things she ever did. It saved thousands of men and women from the yoke and the lash, from being bought, resold, and herded like cattle, but it brought upon England the enmity of the Dutch in Africa and of the planters in the West Indies. The latter had grounds for their discontent.

Only the African negro was strong enough to work in that climate, and he had no intention of doing so unless he was forced. Even when he could be induced to work for good wages the planters suffered, for they had to sell their sugar and other crops in competition with the United States, where slavery was still in practice and production therefore greater and cheaper.

For forty years what was called the Speenhamland system had been making paupers of the rural labourers. In 1795 the justices of Berkshire had met at Speenhamland and come to the well-meant but disastrous decision to add to low wages out of the rates. Others followed their example. It became the custom to help people from the rates, though they were earning. Its effects were that (*a*) employers kept their wages low; (*b*) many labourers, indifferent whether they got their money through work or magistrates, accepted the low wages and drew on the rates; (*c*) the labourers lost their independence and self-respect; (*d*) rates went very high; and the small farmer, who did not employ labourers, was working hard to pay the wages (through his rates) for larger and richer farmers in his parish; (*e*) the really independent labourers who tried to keep from the Poor Law became worse and worse off owing to the payment of lower and lower wages.

In 1834 Lord Althorp, who had helped Lord Ashley (Shaftesbury) with his Factory Act, decided to make a clean cut through the vicious circle. Acting on the advice



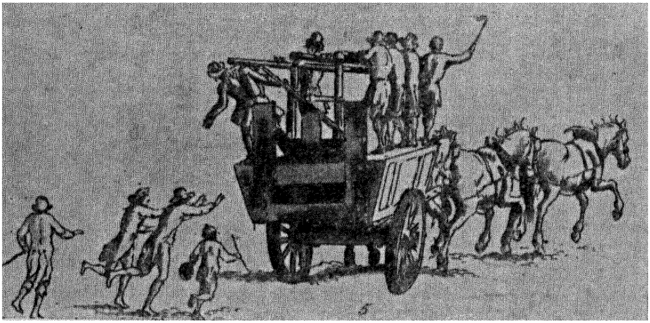
[From the V. & A. Museum, S. Kensington

Three dolls—that on the left represents an English pedlar woman of the early nineteenth century : the centre doll represents a lady of about 1770 : and the doll to the right represents a lady of twenty years earlier.

contained in a report made by a committee of experts he passed the Poor Law Amendment Act. Under this Act the parishes were grouped into Unions ; each Union had a workhouse where the able-bodied poor could live when destitute, relief in their own homes being given only to the sick and aged. These arrangements were to be supervised by " Guardians," elected by the ratepayers of the Union, and a Central Commission was created to frame regulations for the guidance of the Guardians.

The first stoppage of outdoor relief caused great suffering in some places, but gradually the wisdom of the measure was shown. The employer had to offer a better wage and the worker had to earn it. The good workman was no longer discouraged by the fact that the bad workman could get as much or even more money as he by drawing on the rates, and a wholesome horror of the workhouses turned many "professional paupers" into industrious labourers.

Another Act was passed the following year (1835) which deeply affected the towns and their government. In most towns the members of the Corporation elected and re-elected each other from year to year, appointed their friends as aldermen and justices of the peace for life. Thus the citizen had no control over the government of his town: the management was bad and few corporations had done anything towards securing water supplies, or proper drainage, or lighting. Nor had they provided for the proper cleansing of the city streets, where without drains or sewers most of the refuse was thrown. The new towns had created many new problems which needed to be tackled if the citizens were to have decent places to live in and healthy conditions. The old type of town



[From W. H. Pyne's "Microcosm," 1803

An early nineteenth century fire-engine.

corporation which could not be dismissed had usually quite neglected its duties. Thus for forty or fifty years the building of new towns had gone on without proper control, and we have not even to-day corrected all the results of this period of neglect and ignorance.

Two men set out to change this state of affairs, Lord John Russell, the small man with the gift of clear speech who had done so much in the battle of the Reform Bill, and Lord Melbourne. Lord Melbourne, as Home Secretary, had learned a good deal about Corporations; he knew exactly what chances they had of wasting the ratepayers' money and he himself drafted the Municipal Reform Act which took away their chances. Each city or borough was to have a Council elected by all ten-pound householders; one-third of its members was to retire every year, and by this Council a new Mayor was to be elected every year and new aldermen every six years. The accounts of the Council were to be audited and published and municipal property was not to be bought or sold without the permission of the Government. The Crown was to appoint the magistrates whose administration of justice was henceforth to be completely separated from the business of the Councils.

Thus the Reform Act, the Factory Act, the Poor Law Act, and the Act reforming town government were very useful beginnings in the attempt to control the great changes which were still taking place in English life. They did something to prevent further immediate suffering from being caused by these very changes, which were, in fact, making possible a higher standard of living for every one than could ever have been had before. Much more needed to be done, and even to-day all thoughtful people are perplexed by many of the difficulties of our still new industrial world.

CHAPTER XI

THE RAILWAY AGE

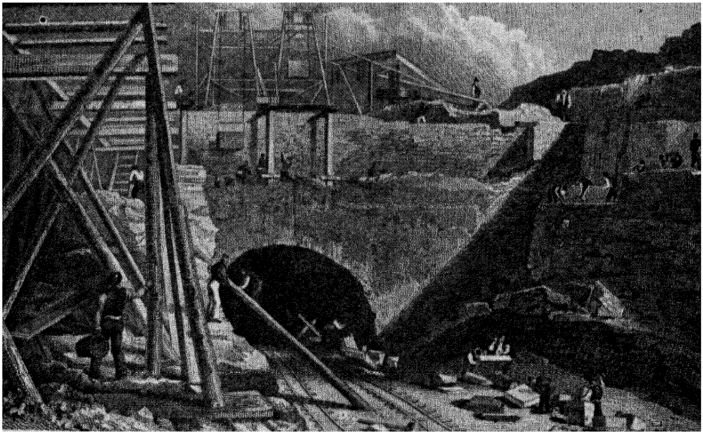
THE early railways proved very successful as carriers of coal and other goods. Soon they began to carry passengers, and the great value of this new means of transport and travel was apparent to every one. Railway building went on very rapidly, and particularly in the years 1836 and 1845 when English people for a time went "railway mad," and George Stephenson became one of the busiest men in England.

By the end of 1845, 2500 miles of line were in working order, and the effect on the country was enormous. The railways made great demands on the iron foundries, engineering works and coal mines, and every trade was encouraged by the immense demands of this new work. Journeys which had taken days or weeks now took hours. The products of the farm, the garden, the dairy, could now be sent from distant places and would arrive fresh and in good condition. Thus the railways made it possible for the townspeople to secure better and cheaper food and much more plentiful supplies. Poor people in the towns benefited greatly because coal could be brought more cheaply and could be used more freely for warming the homes in the cold winter days.

In this early railway building it is scarcely surprising that some bad mistakes were made. Rails were laid from one town to another in short stretches just as the oldest canals had been cut. Even when two or three lines ran into one big town they were owned by different companies and were not connected, so that goods could be sent from A to B or C to B but not from A to C. Even great engineers like Brunel, who built the Great Western, thought so little of "joining up" that the gauges, or widths, between the rails were not made the same on all the new railways. The usual railway width was 4 feet 8½ inches, as this was the width of most of the old colliery tramways from which the railways had developed, but Brunel used a 7-feet gauge, with the result that no engine built for any other line could run on the Great Western, which remained as severely unconnected with other railways as if it had belonged to another country until the whole of Brunel's track was relaid years later.

The financial success of railways was very greatly helped by their passenger traffic, a fact which astonished the companies themselves, who had believed that carrying goods would be their chief business. The Government passed an Act in 1846 ordering that a certain number of trains were to be run "at a reasonable speed," on which covered carriages were to be provided for passengers at the rate of one penny per mile, third class. At first the companies protested against such low fares, but they were soon silenced by finding their position improved through the enormous increase of passengers. Here again the large number of people moving about the country was not only good for the railways but also for the manufacturing trades. For men walking down a shop-lined street saw many things they determined to buy which they would never have thought of when the difficulties of travelling had previously kept them in their own small villages.

Thus the railways, the factories, and the ever-increasing demand for coal and iron made by both, rapidly built up the rich and prosperous towns of the Midlands and the North of England. In agricultural England, the England of Defoe (who, you remember, regarded anywhere north of the Trent as a difficult and strange country), by far the greater number of people lived in the southern counties, where the soil was rich. In industrial England, the England born in the eighteenth century, the greater number live in the north, near the great coalfields which feed the iron-foundries, which in their turn feed the factories.



[From "Lancashire Illustrated," 1831

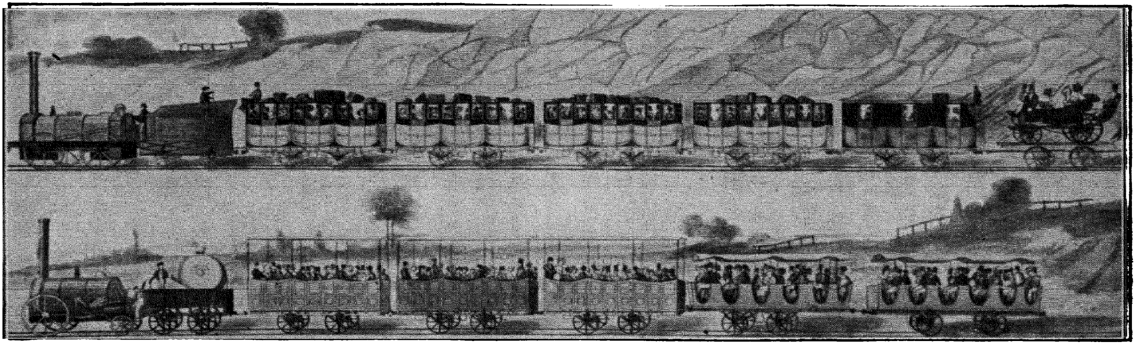
The entrance to one of the earliest railway tunnels under construction: the tunnel of the Liverpool and Manchester Railway at Edgehill.

The method of controlling the actual traffic on these railways was at first very clumsy. Semaphore signalling was used by day and coloured lamps at night, while messages were sent by runner, or on the trains themselves. The Great Western was the first railway to instal the newly-invented electric telegraph, between Paddington and West Drayton in 1839, extending it to Slough in 1843.

You will remember that Faraday, following up the discovery of Oersted the Dane about the connection between electricity and magnetism, discovered electro-magnetic induction, which we have already explained (see Chapter IX). It was next found that this current, springing between two coils, could be passed for considerable distances along a wire and retain sufficient strength to move a magnetic needle at the far end. A system of sending signals was then made ; when the needle pointed one way it meant one letter, when the current was changed and it pointed another way it meant another letter. So whole messages could be spelt out through the electric current and the distant needle.

Two men, called Cooke and Wheatstone, saw the great commercial possibilities of this new way of sending messages, more quickly than any which had been known before. They formed companies to put the invention into practical use, and as we have seen, the Great Western Railway was one of the first concerns to adopt it. No one however, was very deeply impressed with its importance until a dramatic incident set all England talking of it in 1845 (the eighth year of Victoria's reign). Then a man committed a murder at Slough and escaped by train to London. But his description was telegraphed immediately to London, so that when he stepped out of the train at Paddington he found the police waiting for him. This publicity given to the invention caused its much wider adoption. Cooke and Wheatstone busily formed more companies, the system spread all over the country, and both men made fortunes.

A few years later the telegraph was adapted to the use

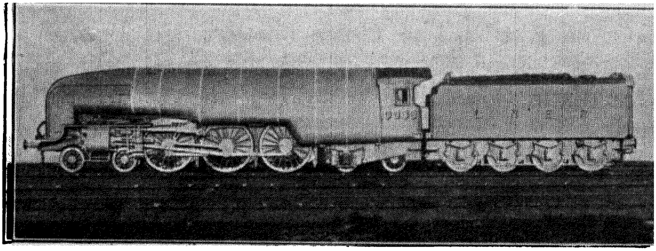


Courtesy] [L.N.E.R.

These trains ran on the Liverpool and Manchester Railway. The top picture shows a mail train with first-class carriages and the bottom one a train of second-class carriages.

of the Morse code,[1] which was even quicker than the old needle signalling. Then in 1861 a German called Reiss discovered that electricity sent along wires could be made to reproduce sounds. Within another ten years, Bell, an American of Scottish birth, had experimented so successfully with this sound apparatus that he was able to reproduce the human voice, and the telephone came into being (1871).

For a time both telegraph and telephone were controlled by private companies like Wheatstone's and Cooke's. All the railways possessed their own lines through which the system of signalling invented by Charles Gregory in 1846 was operated, enormously increasing the speed and safety of travelling. But apart from the railways it was wasteful and unsatisfactory to separate telegraph companies so that the users of each company could only telegraph to one another. The ideal was to have one big company so that messages could be sent from any one place in the country to any other with the least delay and at the least cost. To this end the



[L.N.E.R.

L.N.E.R. High Pressure Compound Locomotive No. 10,000 (1930).

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[1] In the Morse code each letter of the alphabet is represented by a certain number of " longs " and " shorts "—*i.e.*, long and short flashes (if light signals are used), long and short buzzes (if sound signals) and dashes and dots when the code is written.

Government bought up all the existing companies in 1868, uniting and expanding them into the system we know to-day controlled by the Post Office.

Meanwhile all this activity on land had its counterpart at sea. In 1838 (midway between the two railway manias) the first two steamships crossed the Atlantic. They were the *Sirius* (703 tons) and the *Great Western* (1340 tons), both wooden paddle steamers fitted with Boulton-Watt engines adapted to marine use, and carrying sails in case of accidents.

The *Sirius* started first, steaming out of Cork harbour amid cheers and parting shouts of " Good Luck " on the 4th of April. The *Great Western* left Bristol four days later and tried to overhaul the small boat and to win the distinction of being the first steamer to cross the Atlantic. The *Sirius* kept her lead and reached Sandy Hook on April 22nd. The *Great Western* arrived the next day, so the honours of the race were shared, the *Sirius* being the first steamer to complete the journey, the *Great Western* having taken three days less to do it in. Steam had conquered distance at sea as she had on land ; next electricity " took to the water."

Telegraph wires covered by six thicknesses of protective casing were lowered to lie along the bed of the Channel between Dover and Calais in 1851, and the success of the venture set men thinking of an Atlantic cable. For this a special ship, the s.s. *Caroline*, had to be constructed, with storage drums for the vast coiled cable, and a paying-out machine to control its weight as it was run overboard. Then the ocean bed had to be " prospected " to find the route with the best and most even surface for the cable to lie on. The cable itself consisted of a core of copper conducting wires surrounded by gutta-percha and protected by a thick covering of jute, over which was woven a sheath of iron wires and outside that again hemp treated with tar, india rubber and pitch, and a final casing of tarred canvas. Yet the whole was so compressed that the deep sea or thinnest section was only about an inch in diameter.

The s.s. *Caroline* set out and successfully accomplished her mission without adventure in 1865. But the adventures of the cable would be well worth writing, as old cables which have been drawn up to-day prove. Strange ocean plants grow on them, sharks have been known to bite them and leave their teeth in the plaited iron sheathing, swordfish have pierced them, the casings have been worn away one by one rubbing against jagged rocks and nearer the shore ships' anchors have fouled and torn them. Yet the cable's greatest enemy is none of these, but a tiny boring worm called the teredo. This little sea-worm bores a hole no bigger than the worm holes to be seen in old furniture, but it bores in time, right into the heart of the cable, so that the wires are corroded or the current escapes, making the whole line useless. Delicate instruments on shore enable skilled operators to detect just where the injury has occurred and telegraph ships fitted with machinery which can grapple the cable and hoist it to the surface are sent out to effect repairs.

So England and America have remained joined by submarine telegraph wires ever since the *Caroline* completed her journey, and later, telephone wires were laid as well, so that it became possible for a man in London to talk to a man in New York—though it cost him twenty pennies a second to do it ! Now as we all know, electric signals may be sent through the air, and London may telegraph and even talk to New York or to Sydney by wireless !

CHAPTER XII

THE CORN LAWS AND CHARTISM

Cobden, Bright and Owen

WE have already mentioned the *Corn Law* which in years of bad harvest kept the price of corn, and therefore of bread, high in England, and helped to cause much suffering among the poor. There had been corn laws before, but this famous law was passed in 1815, the year of Waterloo, when it became evident that instead of the prosperity which men had hoped would come with peace, Britain was going to suffer a period of distress and of bad trade. Under this law no foreign corn might be imported until the price of English wheat stood at 80*s.* a quarter. It was a law intended to help farmers, many of whom had bought their land at high prices during the war and who now expected to be ruined by the great fall in prices ; it was passed by a Parliament in which the vast majority of members were themselves landowners. They had not realised the fact that England was no longer chiefly an agricultural country, and it took many years for men to realise that whatever good the measure did to farming was outbalanced by the harm it did to industry. The town workers had a lower standard of living because their food, in these bad years, was costing more than it should have done.

By 1828 it became evident that the law was not

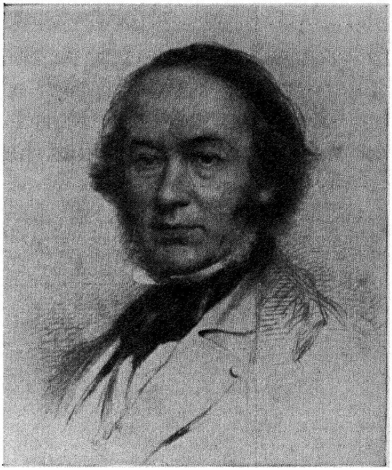

Photo. Mansell] [After Lowes Dickinson

Richard Cobden.

entirely successful, but even then there was no thought of repealing it altogether. It was amended, and a sliding scale of duties on imported corn drawn up : that is to say, the duties were made to vary with the price of corn in England. Not until eight years later was an organised demand made for the abolition of the law. The first mover was an historian called Grote, who formed an Anti-Corn-Law Association in London in 1836, but the two men who did the most brilliant work in the campaign were Richard Cobden and John Bright.

Cobden was the son of an unsuccessful yeoman farmer at Heyshott, in Sussex, where he was born in 1804. When he was ten a rich uncle paid for him to be sent to a boarding school in Yorkshire, and there he stayed for five years without ever going home or seeing any of his family or friends. It was a terrible place, something like the school called Dotheboys Hall, described by Dickens in *Nicholas Nickleby*. The bullying, lying, cheating and dirt might easily have spoilt Richard's character, but instead, like Lord Shaftesbury, he learnt, through his own unhappiness, to pity all others who suffered. When he left he was made a junior clerk in his uncle's warehouse, but in 1826 the uncle went bankrupt and young Cobden was thrown on his own resources. He did so well that by 1838, the year he formed the Manchester branch of the Anti-Corn-Law league, he had become a prosperous calico-printer with a factory of his own. Further, he had travelled all over the world making a close study of industry and trade. Thus he brought a very complete knowledge of the facts combined with a clear logical brain to his attack on the Corn Law. To him it was not enough to show pity for the poor by charity; he aimed to alter some of the conditions which made charity necessary, and to lower the price of bread was the first step.

George Cruickshanks's drawing of a scene in "Dotheboy's Hall." The school is described in Dickens's "Nicholas Nickleby." It was supposed to be at Greta Bridge, near Barnard Castle, Yorkshire.

In 1841 he was joined by John Bright, a Quaker manufacturer of Rochdale. Bright had seen misery enough in the crowded streets round his father's cotton mill, and while Cobden's logic could convince the men's intellects, Bright's oratory fired their sympathies as few other speakers have been able to do. With the simplest words, he created an impression so vivid that he roused huge audiences to enthusiasm.

Both became members of Parliament, Cobden for Stockport in 1841, Bright for Durham two years later, and together they kept the Corn Laws constantly before the House. It was a hard fight, even though during 1840 and 1841 trade was so bad in England that these years became known as "the hungry forties."

Sir Robert Peel had drawn up brilliant budgets from 1842-1845, heading towards Free Trade by reducing a great many duties and making up the loss this meant to the Treasury by re-imposing the Income Tax, a measure Pitt had introduced during the Napoleonic Wars. But Peel belonged to the party in favour of the Corn Law, and he left the duty on corn almost unaltered. Yet he was not untouched by the arguments of Cobden and Bright; indeed he gradually became convinced by them, for one day in 1844, when Cobden was addressing the House, Peel, who had been taking notes to get up and oppose him, suddenly crumpled up the paper and whispered to a colleague, "You must answer this, I cannot."

But though Peel no longer opposed the Anti-Corn-Law Leaguers he did not support them until the following year when the effects of the Irish famine left him no longer in doubt as to whether he should act on party principle or personal conviction.

Ireland, " the last outpost of Europe against the vast flood of the Atlantic," has had from the earliest times, the most passionate and tragic history of all the British lands. She was perhaps more deeply influenced by the French Revolution of 1789 than any other European country. Distress and confusion followed. A society called the United Irishmen was formed (1791) by a young Protestant landowner called Wolfe Tone. Six years later, when Napoleon had just recaptured Toulon from the English and Nelson was fighting against the French fleet, Tone made an alliance with France, who sent troops to help him in a rebellion against England. The rebellion was crushed, but other risings followed. They, too, were put down and many leaders were hanged, including Robert Emmett, friend of Tom Moore, the poet. Ireland was given a Parliament of her own, but it consisted entirely of Protestant landowners, while eleven-twelfths of the Irish people were Roman Catholics. Pitt befriended Ireland and tried to give her free trade with England and the colonies as Scotland had been given it, but his Bill was thrown out. Pitt's next attempt to settle Irish difficulties was the Act of Union (1800) which created " The United Kingdom of Great Britain and Ireland."

The Parliament in Dublin then ceased to exist and Ireland sent her Protestant representatives to Westminster. There Grattan and Plunket worked for Catholic Emancipation, which came at last in 1829 when Daniel O'Connell, a Roman Catholic, was elected as M.P. for Clare in defiance of the law, and England had to choose between letting him take his seat and civil war in Ireland. Catholics were then allowed for the first time since the Restoration to hold public appointments and to become officers in the Services.

But Ireland continued to be poor and the scene of troubled passions, often badly mishandled by English statesmen. O'Connell spent his time agitating for the Repeal of the Union in brilliant, furious oratory; the more sober (and mainly Protestant) northern counties upheld it. There were countless secret societies; the country was divided against herself, torn by many hates and loyalties. Though the reforms of Parliamentary and local government which we have followed in England also came into force in Ireland and her roads and railways slowly followed the bigger island, she never became really prosperous. And in 1845 famine swooped upon her.

Potatoes were the main food of the Irish peasants; and in that year an unknown potato disease swept over Great Britain. Potato plants which were green and flourishing at night were the next morning black fetid masses, rotten with decay. While this misfortune was a severe loss in England and Scotland it spelt starvation to the Irish. Food was rushed from England, railway and shipping companies accepting free of charge packages marked "Ireland," but not enough could be sent. Many thousands of the Irish peasantry died of hunger; terrible stories came through of their sufferings, and Peel saw that the only hope of helping them was to send corn, as much and as cheap corn as possible. In one way alone could this be done. On June 25th, 1846, Peel repealed the Corn Law, and foreign corn poured into the country and released both corn and potatoes for the Irish people.

Side by side with the work of the Anti-Corn-Law League another movement was advancing in England. This was Chartism, whose most enthusiastic inspirer was Robert Owen. He was one of the small company of manufacturers in early industrial England who were not either harsh or thoughtless, stupid masters.

[From the "Book of Trades," 1815

Hairdressers were kept busy curling gentlemen's wigs, while they read the paper, just as ladies do now when they are having permanent waves put in.

He was the son of a saddler, born at Newtown in Montgomeryshire in 1771. His father was poor, and with a family of seven children could not keep Robert at school. He was, however, a clever industrious boy, and at nine years of age was already earning a few shillings a year from his schoolmaster by teaching children younger still to read and write. When he was only ten he set out alone with two pounds in his pocket to join an elder brother in London, confident that he would make his fortune. He began as a draper's shop-boy. The draper was an excellent master and his customers wealthy, well-bred people from whose manners Owen learnt much. He also, as far as possible, copied their clothes, and became something of a dandy, for he tells us in his autobiography that, "Boy as I was, I waited my turn for the hairdresser to powder, pomatum and curl my hair," and he even aspired to a flowered waistcoat and a fob ! He rose rapidly. In his teens he was assistant to a Manchester draper with board, lodging and a salary of forty pounds a year.

There he met a young man, Jones, a maker of wire bonnet frames, who told him of the new spinning machinery, and suggested that they should go into partnership and make jennies. Owen consented, but Jones proved a very unsatisfactory partner, who finally decamped, leaving Owen at nineteen in possession of a worldly fortune of three spinning jennies. Not at all daunted Owen set to work to spin very fine cotton yarns for muslin, which until then had chiefly been imported from India. By 1800 he controlled four prosperous cotton mills at New Lanark, near the Falls of Clyde.

Here he systematically and voluntarily introduced all the methods which the anti-reform party said must end in ruin. His workpeople had comparatively short hours; no women worked on night shifts; boys and girls under nineteen had half-holidays on Saturday; he used no pauper children, and indeed refused to work any young children at all, providing instead free education for the families of all his employees. Yet at first the mill hands actually resented his interference in their old habits! Then in 1806 he won them over once and for all. In that year the United States temporarily stopped the supplies of raw cotton and there was nothing to spin. Mill workers in the district were without employment, and were left to fend for themselves. While money lasted many drank and quarrelled; then they starved. But Robert Owen, knowing that a period of unemployment would undo all he had struggled for, kept on his whole staff, paying them full wages for four months for merely keeping the machinery clean. From then on he got a standard of work to be found in no other mills.

The system at New Lanark grew; the schools were improved, Owen opened other institutes, and visitors came from all parts of the world to see the "reformed, model factory." Among them were the Tzar Nicholas I (who wanted to transport Owen and his system bodily to Russia) as well as the Duke of Holstein, Prince Maximilian of Austria and the Saxon ambassador. But though outsiders admired his results, few of his fellow manufacturers copied his methods. Owen became convinced that only when the workpeople themselves were admitted into co-operation with employers in the control of industry would matters really be improved.

His theory took shape in the Grand National Consolidated Trades Union, which was to unite all workers, control manufacture, and destroy individual competition. The Union grew with enormous rapidity. All manner of workers' associations belonged to it from miners to chimney sweeps, ploughmen to women tailors. Manufacturers grew seriously alarmed. It was not possible to revive the Combination Laws but it was possible to use the Law of Conspiracy, and they made the most of it. Then the workers spoilt their own chances by a great many strikes and acts of violence. Robert Owen had held too high an estimate of the working man's knowledge and experience ; also he underestimated the difficulty of the problems these new Unions had to try and solve. He probably did not realise how much greater was his own character and ability than that of most men of his time.

The outcome of this uniting of the working masses was the People's Charter (1838) which made six demands: (1) Universal Suffrage,[1] (2) Voting by ballot,[2] (3) Annual

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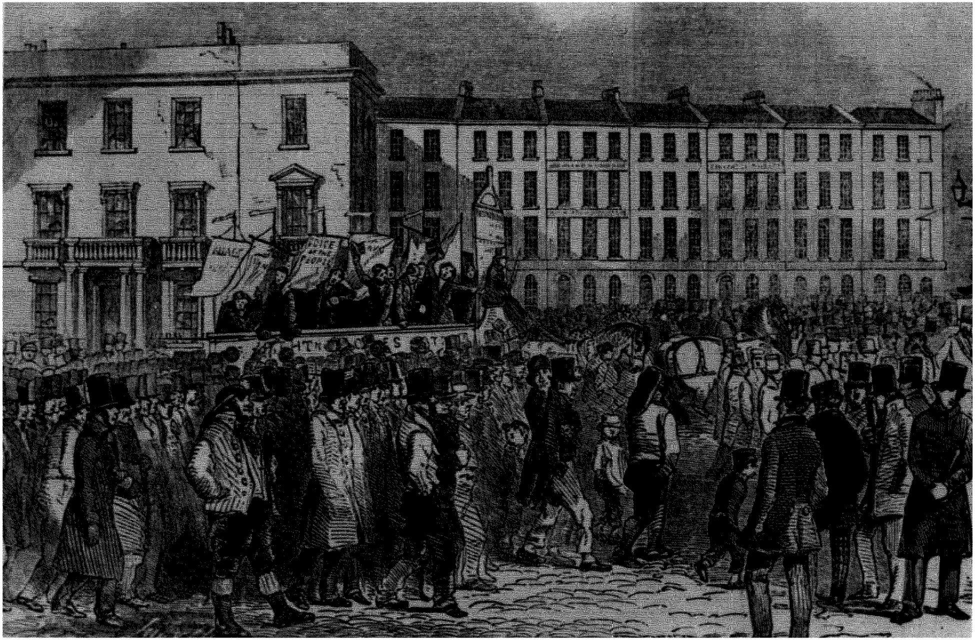
[1] That is, every man and woman to have a vote.

[2] The voting papers are put into a ballot box so that no one knows how a man has voted.



Contemporary Print. *Rischgitz.*

Chartist Procession at Blackfriars Bridge, London.

Facing page 158.

Parliaments, (4) Abolition of the property qualification [1] for M.P.'s, (5) Payment of members, (6) Equal electoral districts. The supporters of these demands were called Chartists; they quickly fell into two groups, the Moral Force Chartists, who hoped to attain their ends by agitation and persuasion, and the Physical Force Chartists, who began regular secret drilling and planned rebellion.

But, for some years, the vigorous and well-directed efforts of the Anti-Corn-Law League competed successfully with the Chartist movement for the sympathy and support of the people, and the Chartist movement began to die down. Later, with growing trade, with the building of railways, which found work for immense numbers of men, and with a general rise in wages and an increase in the comfort of the workers, the violent discontent died down. Chartism weakened and finally, after a short reawakening in 1848, disappeared.

Meanwhile, Lord Shaftesbury laboured on in his untiring, less dramatic way as a champion for the workers' cause. As we have seen, his act prohibiting child labour in the factories resulted in some cases in the children being sent into the mines. Shaftesbury followed them. In some pits he found children of five and six working twelve or thirteen hours a days in the wet and grime and darkness ; in others, women and girls, half-naked, were harnessed to trucks which they drew, sometimes on their hands and knees, along underground tunnels for even longer hours at a stretch.

Shaftesbury acted promptly. In 1842 he carried the Mines and Collieries Bill, prohibiting the labour of all boys under ten and of all women and girls of any age whatever in the mines.

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[1] A " property qualification " means that a man is not allowed to be a Member of Parliament unless he has a certain amount of property.

Then he returned to the factories, and with the help of Fielden got the Ten Hours Act passed in 1847. This limited the working day of all except adult men to ten hours and again improved the position of the children, whose education became Shaftesbury's next care; the setting up of schools for the education of poor children owed much to his efforts.

You will remember that in *The Water Babies* there is a vivid account of the work and sufferings of the little chimney-sweeps, and of how the horrible Mr. Grimes used to light a fire of straw under poor Tom to make him climb up inside the chimney, scraping down the soot as he went. It was Shaftesbury again who got this cruel practice abolished by an Act prohibiting "climbing boys," in 1840. He also supported Lord John Russell, who, following up Peel's work, had passed a series of Acts (1832-1841) steadily making the Criminal Code more just and humane.

CHAPTER XIII

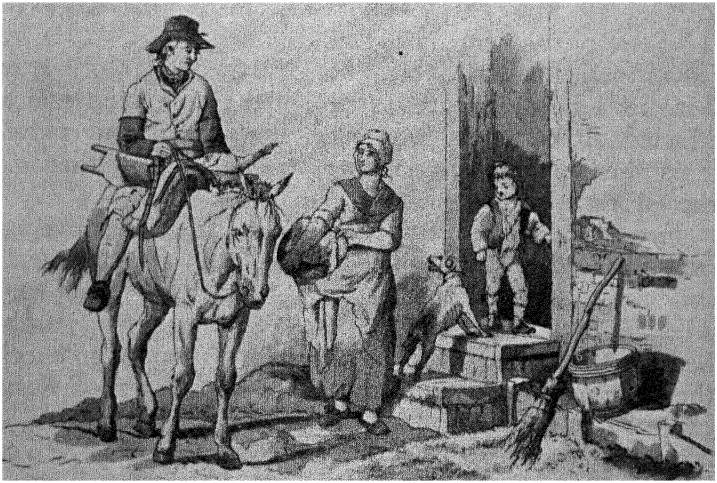
THE PENNY POST, NEW MACHINERY, AND THE GREAT EXHIBITION

IN 1839, just after Cobden formed the Anti-Corn-Law League, a new measure was adopted in England which affected almost every one who could read and write. This was the introduction of the Penny Post, through the efforts of Rowland Hill.

Ever since the fifteenth century the State had conveyed letters for a fee, keeping special horsemen to carry them. In Stuart times the office of "Master of Posts and Messengers" was created, an office eagerly sought because there were no fixed rates and no stamps to check the charges made; thus the office of Master of Posts could be, and usually was, a very profitable one.

In the eighteenth century the system was improved a little, a scale of charges being drawn up varying according to the distance the letter was to be carried. London to Cambridge cost 8*d.*, London to Durham 1*s.*, and so on; but this still left loopholes for a postmaster with an easy-going conscience to overcharge on letters sent to smaller places where the distances were not so well known. To send anything of importance or value by post was still a risky business as the horse messengers were very frequently attacked by highwaymen and robbed. Sometimes the risk of loss was avoided by cutting documents or banknotes in half and sending the halves by separate posts, but naturally the insecurity meant that the post was not used nearly as much as it might have been.

When the making of better roads brought the stage-coach services, the letters were sent by coach instead of horsemen, and the mail coaches carried an armed guard. This made the post much safer and more use was made of it, but still many could not afford the high fees. Again, members of Parliament had since 1660 had the privilege of sending letters post-free, and this privilege was much abused at the expense of the Revenue, many other persons who could have afforded the fees getting their letters " franked " or sent free through M.P. friends. In fact, the postal system was barely paying its way when Rowland Hill took the matter up.

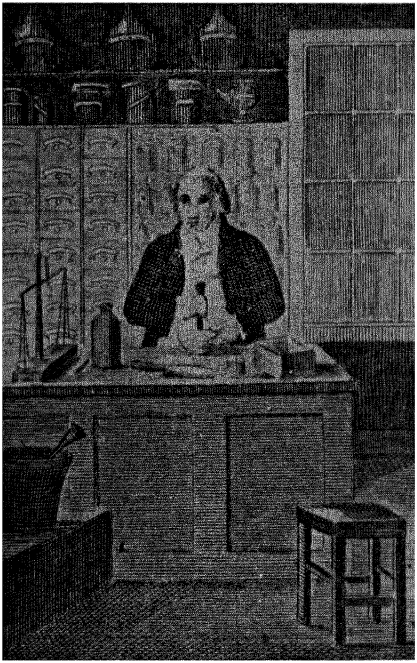


[From W. H. Pyne's " Microcosm," 1803

The early country butcher brings the joint to the door: a typical nineteenth century country scene in England.

He saw that if all letters were carried anywhere for a penny each so many more would be sent that the change would be bound to mean gain, and he also suggested the abolition of the privilege which made "franking" possible. He set out the scheme in a pamphlet called *Post Office Reform*, but though it was eagerly welcomed by the country, financial experts scoffed at it, and the House of Commons received it with indifference slightly balanced towards hostility. A penny was very little, but they preferred paying nothing. Hill, however, fought for his point, and in 1839 got a special committee appointed to go into the matter. The committee reported in his favour, a Bill was passed, and on January 1st, 1840, the penny letter-post came into being throughout the United Kingdom. Its success was immediate. Few things indeed have done more to bind the country together and stimulate the intercourse of its people except perhaps the railway. Half-penny postcards and half-penny rate for a certain weight of "printed matter" followed in 1870; the Post Office made a handsome profit for the Revenue, and developed so much that since then, as we have seen, it has taken over the control of the telegraph and telephone also. Trade profited as greatly as individuals; "the penny post and the telegraph became the nervous system of commerce, while the railways acted as its arteries, bringing fresh life wherever they went."

Conditions of life for the working class now showed a steady and general improvement. Better wages were paid and employment grew more regular. Manufacturers, working in a small way, sometimes harsh and cruel in their anxiety to succeed, often having a great struggle in the face of keen competition, gradually gave way in some industries to big companies able to come to more generous agreements with their employees. While the



[From the "Book of Trades," 1815

The nineteenth century apothecary, who represents our modern chemist, busy pounding medicines in his shop.

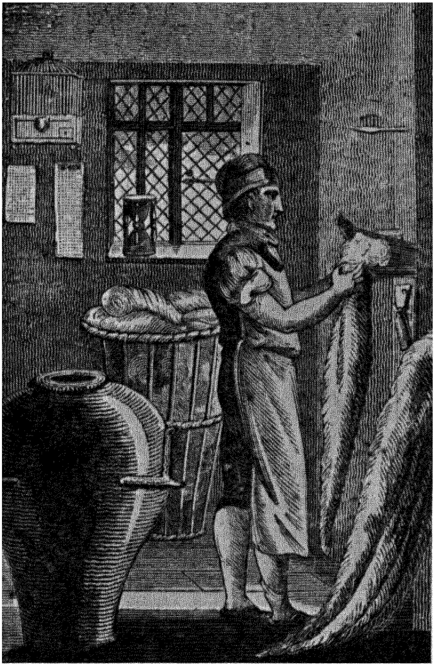
old Trade Unions were sometimes violent and sometimes dreamed impossible dreams, they now gave place to the better organised "new model" Trade Unions which we have already mentioned. These were practical in aim and spirit, seeking to induce self-help among the workers and combined with their protection of the worker in his work, unemployment and sickness benefits which greatly helped the worker and his family. The leaders of these "New Model" Unions, whose members were skilled craftsmen, negotiated with employers and avoided strikes; they built up great funds and were strong enough to make much better terms with employers than the earlier unions had been able to do.

Another sign of the times was the birth of the Co-operative movement, which has helped to check the small shopkeeper in the working-class districts from making unfair profits, and has given the working class training in self-government and in business management. It originated in a humble way through the effort of twenty-eight poor weavers of Rochdale. They began by saving twopence, then threepence a week each until they had a capital of £28. Then in 1844 they opened a tiny shop in Toad Lane, Rochdale, which was run on quite new principles. They sold all goods at market prices, and divided the surplus among their members in proportion to what each had bought. The buyers were thus naturally interested in the management of the business; they formed a Society, got their friends to become members, and, as people realised that this new kind of shop did not attempt to make big profits at their expense, the Society grew and grew until the one room in Toad Lane was replaced by a big three-storeyed building.

Others quickly followed the Rochdale example, and the movement gained the sympathetic and active support of many prominent men. Several famous writers gave great help and advice to the leaders of this Co-operative movement. Charles Kingsley, who wrote *The Water Babies*, Ruskin, Carlyle, and Tom Hughes, who wrote *Tom Brown's Schooldays*, all helped to spread the idea and laid the foundation for all the modern retail co-operative societies with their many thousands of members and for the huge concern, the Co-operative Wholesale Society, which buys most of their goods for them.

Meanwhile, progress also continued in the making of machinery, and several new inventors were winning fame.

One was Samuel Lister, later Lord Masham (not to be confused with Joseph Lister, the great surgeon). He was born at Leeds in 1815, and his parents intended him to go into the Church, but he had early decided upon a business career and, being a young man of strong will, he went into the counting house of a firm of Liverpool merchants instead. In their service he made several journeys to the United States, acquiring a pronounced



[From the " Book of Trades," 1815

The early nineteenth century wool-comber: he has no machine, but has to do his combing by hand.

accent and the nickname of American Sam. He also acquired enough money to begin business on his own as a worsted manufacturer at Manningham, near Bradford in 1838.

The great problem of the trade was to devise a wool-combing machine which would cast out the short fibres, not used in worsted, as well as straightening and cleaning the long curly threads. Cartwright, the inventor of the power loom, had patented a wool-combing machine in 1792 which had been several times improved, but certain classes of wool could still only be combed by hand. A mechanic called Donisthorpe had invented a new type of combing machine, but it could only be used on a small scale, and was of no practical use. Lister, however, saw how it could be improved and made to work on a big factory scale. He bought Donisthorpe's patent for twelve thousand pounds (compare this with Crompton's reward of £60 for his " mule " half a century earlier), and in 1843 succeeded in combing at Manningham the first fine worsted wool that had ever been combed by machinery. Two firms alone, the largest in the trade, ordered over fifty of the new machines in the first year of their invention: and for each machine sold, Lister received a royalty of £1000.

His next invention concerned silk, and changed his nickname from " American Sam " to the " Yorkshire Silk King." One day he was visiting a London warehouse he saw a great pile of " chassum," or waste silk, broken cocoons and stuff too poor to spin in the ordinary way.

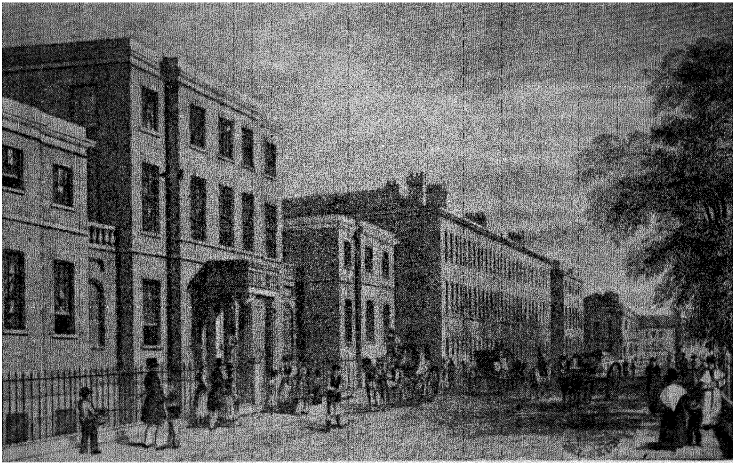
" What is done with it ? " he asked.

" Nothing," was the reply. " It is just rubbish."

Lister bought the whole pile at a half-penny a pound. He took it back to Manningham and began to make experiments. The machines he needed were delicate, the workmen skilled. England could provide neither but Lister was undisturbed. He imported a Spaniard who had invented a loom for making velvet, sent to Italy and France for a score of highly-trained silk workmen, and by the end of ten years he had five thousand hands turning the " rubbish " into velvet, imitation sealskin, plush, carpets, poplins, ribbon, bath towels and dish cloths ! One man had found eight distinct uses for the despised silk waste, and he became a millionaire and a peer, and died at well over ninety years of age, with 107 patents to his credit.

Another important inventor was William Armstrong, afterwards Lord Armstrong, the son of a corn merchant, born at Newcastle in 1810. His bent for mechanics showed itself early; before he was twelve he constructed beautiful little working models which would pump water and grind corn, and his favourite playground was a joiner's shop where fittings for engineers were made.

Yet he was forced to study law by parents unsympathetic to scientific pursuits. This, however, could not cage his

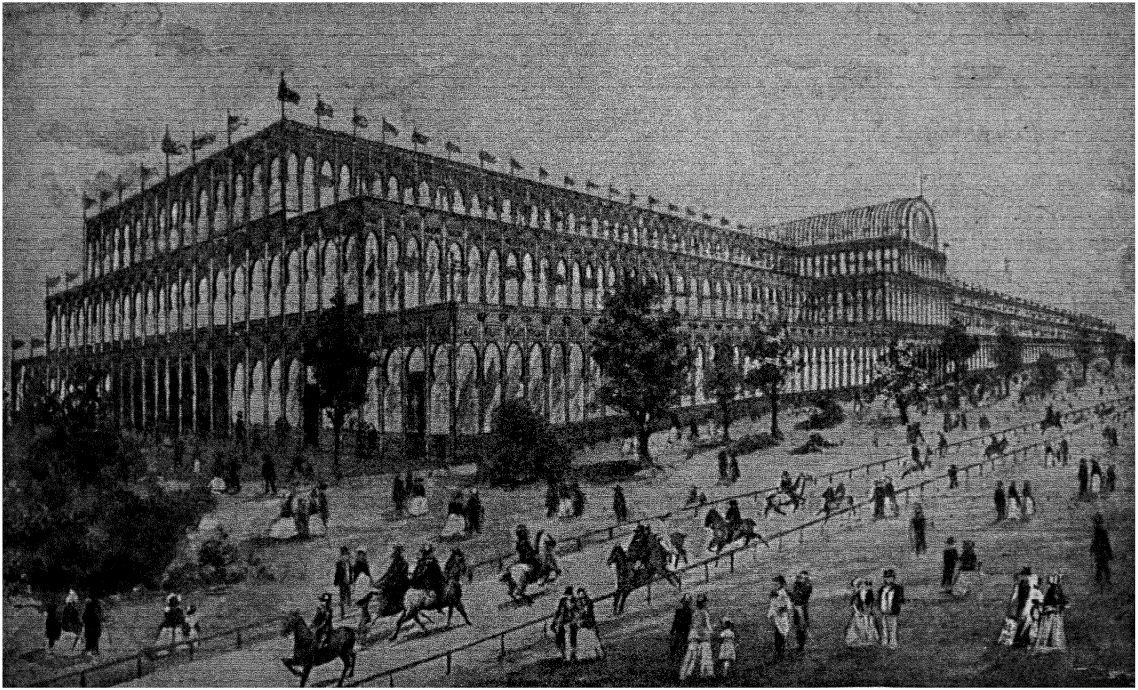


[*From "Lancashire Illustrated," 1831*

Colquitt Street in Liverpool, in 1831. Quite a busy street, but how different from our modern town thoroughfares! Study the buildings, costumes, traffic, etc.

busy brain, and he began to experiment in ways of using the force of falling water. After many years of this study of hydraulics (" the science of fluids in motion ") he became the secretary of a company which was to bring a new water supply to Newcastle from some neighbouring hills.

Laying the water-mains through the streets of the city gave him the opportunity he had long desired to test, on a big scale, his theory for an hydraulic crane. The experiment was a success, and in 1845 his first crane was set up, using the pressure of water to raise great weights. The demand for this type of machine quickly became so widespread that works were established at Elswick, on the Tyne, and Armstrong retired altogether from his legal practice to become a manager. His invention chiefly affected docks and shipyards. Within a few years hydraulic machinery came into general



The Great Exhibition of 1851. The Crystal Palace is seen as it stood in Hyde Park.

use for.cranes, hoists, lifts, the opening and shutting of dock gates, launching ships, and moving capstans and turntables. His other great inventions were the armoured cruiser and the rifled cannon made during the Crimea War.

Both Lister's wool-combing machine and Armstrong's crane appeared in the Great Exhibition of 1851. This Exhibition was organised at the suggestion of Prince Albert and was held in the Crystal Palace, the wonderful palace of glass erected for the purpose by William Paxton in Hyde Park, and afterwards moved to Penge Hill. Nearly every trade in England sent exhibits, some of historical interest, some the newest of the new. Soft, beautiful materials, almost transparent porcelain, crystal and glass, and the delicate gleaming work of the goldsmiths and silversmiths were there as well as the great machines and the working models of power looms and trains, swing bridges and dry docks.

Queen Victoria opened the Exhibition on May 1st, a day of vast crowds, banked flowers, brilliant sunshine and brilliant uniforms. The Duchess of Gloucester, who was unable to go, is nevertheless able to give us a vivid picture in a letter of congratulation she wrote to the Queen :

" The sight from my window was the gayest and most gratifying to witness. . . . The good humour of all around, the fineness of the day, the manner in which you were received in both going and coming from the Exhibition, was quite perfect. . . . Every soul I have seen describes it as the fairest sight that ever was and the best-conducted fête. Why, Bathurst told me it far surpassed the Coronation as to magnificence."

This was the first of many exhibitions in the capital of Europe, and it opened a new era of international trade advertisement which acted as a great stimulus to commerce.

PART IV

WORLD HISTORY : NINETEENTH CENTURY

CHAPTER XIV

REVOLUTIONARY EUROPE

Louis Blanc to Karl Marx

§ 1

IN 1789 revolution, beginning in Paris, had spread ideas of social and political change throughout Europe. In 1830 France had given the signal for risings in Belgium, Italy, and Poland, though only one (Belgium) had been successful. So in 1848 France once again led the way, and was the beacon to other countries which were restless and discontented with their Government.

The year 1848 is called the year of revolutions.

There had been much distress and unemployment in France, partly as a result of the coming of machines, and the industrial changes which had begun earlier in England. When King Louis Philippe fled to England the first task of the revolutionary Government was to deal with these problems. A man called Louis Blanc, a member of the new Government, came forward with an idea which Frenchmen, and men in other countries too, had been considering for some time. All men, he said, had " the right to work," and to earn wages; and if there was not work and wages for every man, it was the duty of the "State" (the country as represented by the men it had chosen to govern it) to provide work and wages for all.

To put Louis Blanc's idea into practice, national workshops were to be set up in Paris, organised by the State which was to pay the wages. So to Paris flocked crowds of men who were unemployed or employed at lower wages than the State offered. They came from all over France; and there was no work ready for them to do.

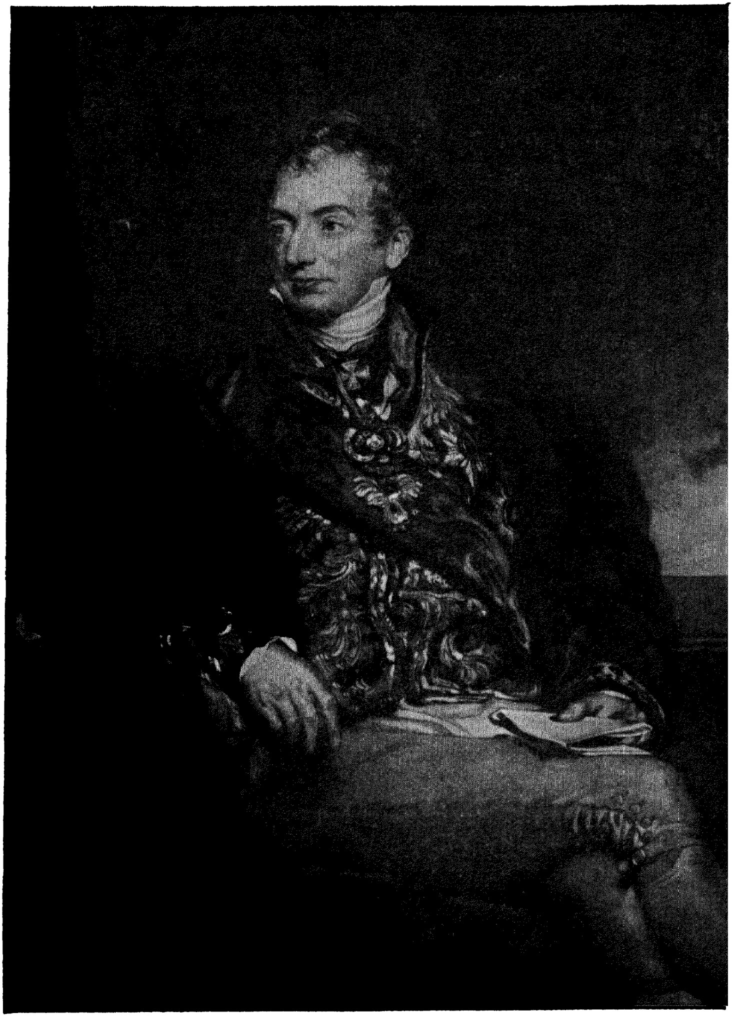
Skilled workmen were set to clear the ground for a railway-station, and when that was done, to dig up earth in an open space, and put it back again. "The right to work," complained the farmers and peasants, seemed to mean the right to be paid wages at the expense of the taxpayer, whether they were earned or not. Industry and trade were at a standstill, for nobody could compete with the State as an employer.

In hope of being able to control them better, the Government put the men who came looking for work into the National Guard, and gave them arms. Then when it was realised how wasteful and expensive the experiment was, the newly-called Assembly put an end to the national workshops.

Thousands of angry, armed workmen gathered in Paris, and now thrown out of work, made barricades in the street, and for four June days defied the city, until the soldiers routed them.

Louis Blanc's scheme had failed dismally, and the party of socialists and democrats gave way to a party of more moderate republicans.

Who was to be president of the republic? France, afraid of more revolution and a new Reign of Terror, turned to the name made famous in 1799, the name which had brought her glory and made her the greatest



Prince Metternich.

Power in Europe. Napoleon's nephew, Prince Louis Napoleon, was elected President.

The revolutions which broke out in the same year (1848) in other parts of Europe were democratic movements. They were risings of the people against their foreign rulers, demanding that they should have a voice in the government of their countries. Moreover, these revolutions were national movements, with "Hungary for the Hungarians," "Poland for the Poles," "Germany for the Germans," "Italy for the Italians," as a central idea. Unfortunately democracy and nationality were both opposed to the view of Metternich and the rulers of Austria, Prussia and Russia, which was that everything should be done for the people, but nothing by the people, and that popular movements must be sternly suppressed. Metternich's policy was to uphold the settlement of Europe made after Napoleon's defeat in 1815, which paid little regard to the divisions of nations with their different religions, customs and languages.

In Vienna, the capital of the Austrian Empire, there was, in 1848, street-fighting at barricades as in Paris, and students and workmen alike were demanding free speech and a free press and a representative Government. Metternich fled, hidden in a laundry cart, from Vienna which was for a time in the hands of the revolutionaries, and the peoples over whom Austria ruled began to rise and claim their national rights.

The national problem in this empire was, however, complicated. Kossuth, the Magyar patriot in Hungary, was trying to win not only freedom for his country, but also equal rights for the townspeople and peasants. The Slavs (people akin to the Russians) of Croatia, however, cared even less for the Magyars who wanted to rule them than for the Austrians; consequently it was the Slavs who, under their Slav leader, Jellalic, remained loyal to the Emperor, and helped to restore the old order first in Vienna and then in Hungary. The Tsar interfered to help the Emperor, who had to abdicate in favour of his heir, though the empire remained intact.

§ 2

Another nation had, however, taken advantage of Austria's troubles to rise and attempt to throw off her yoke. In 1848 Italy was not a nation. It was divided into several states, the chief of which were Piedmont under the King of Sardinia, Rome and the Papal States under the Pope, the kingdom of Naples and Sicily; and Venice and Lombardy which were held by Austria.

Italian national feeling had been aroused fifty years before, when Napoleon and his soldiers had marched through Italy driving out the Austrians. Every Italian patriot was agreed that there could be no united Italy until the Austrians were driven out again, for it was Austria who was the " arch-tyrant."

" All great national movements begin with the unknown men of the people, without influence except for the faith and will that counts not time or difficulties." So said Mazzini, the Italian patriot, who gathered into a society, called " Young Italy," the enthusiasts for Italian unity, worked for it through a life of danger, imprisonment and long exile, and lived to see his dream come true.

Among the numbers who joined his secret society was a young sailor who heard of it and joined it on the shores of the Black Sea. His name was Garibaldi. Garibaldi had led an adventurous life before 1848: he had been mixed up in an unsuccessful rising in 1834, and had had to escape to South America under penalty of death. In spite of this he came home in 1848, when he heard that

Milan, the capital of Lombardy, and Venice, had risen against Austria; that the King of Piedmont and Sardinia had joined the nationalist party, and was leading an army against the Austrians; and that there was work for Italian patriots.

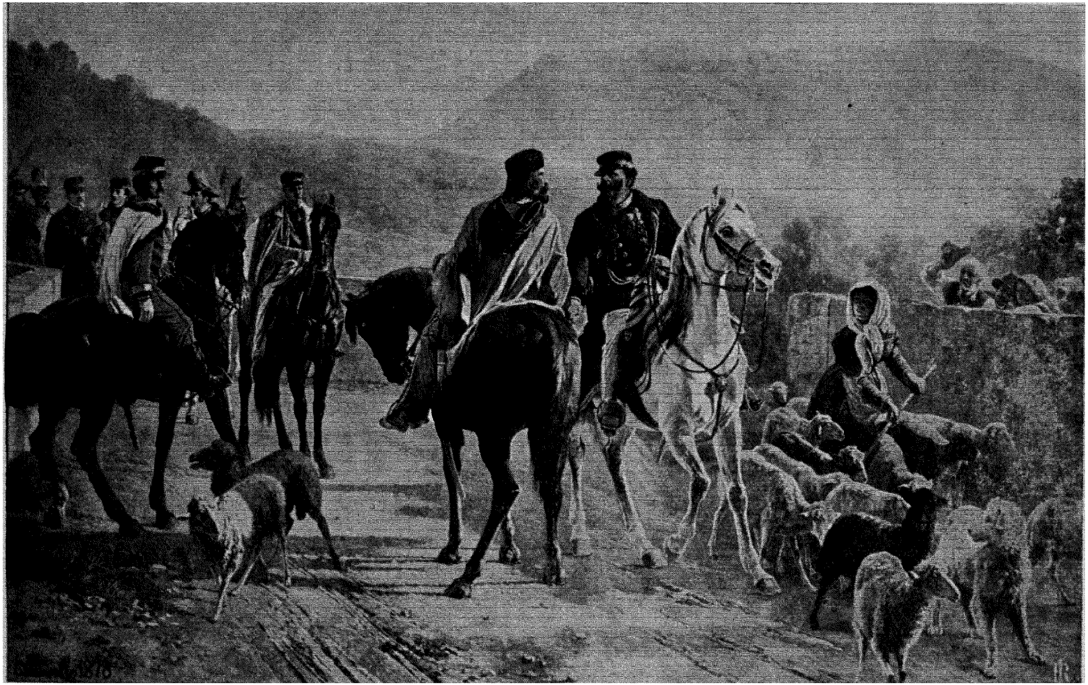
Charles Albert of Piedmont was defeated, and Garibaldi too, by the Austrians, for the small army of Piedmont, and the eager but untrained volunteers who joined Garibaldi were no match alone for a large, trained Austrian army. But Italian resistance was far from ended.

The Pope had fled from Rome, leaving it a little republic in the hands of Mazzini, whose ideal Italy was a republic with Rome as its centre. Now Garibaldi went to join him, and to organise the military defence of Rome.

The fate of the patriots at Rome was in the hands of the new French President, Louis Napoleon, for the Austrians were still besieging Venice, and fighting Piedmont which had risen again. Besides they had to deal with revolution at home, and war in Hungary.

If the new French republic should decide to support the new Roman republic, Italian unity would begin to be more than a dream. But no, Louis Napoleon decided to support the Pope against the republicans: and sent an army to take Rome (1848).

After a month's siege Rome fell. Garibaldi and some of his volunteers escaped, in the hope of relieving Venice, when they knew that Rome must surrender, but this, too, was impossible. Garibaldi barely escaped with his life from the Austrians, who hunted him over the mountains: and his wife, Anita, who had been with him through all the adventure, died of the hardships of this flight. Garibaldi went back to lead an exile's life in South America: Mazzini fled to England, and at last Venice fell to the Austrians after a siege of more than a year.



[Mansell

The meeting of Garibaldi with Victor Emmanuel II.

Italians had to wait ten years more before anything was achieved towards the unity of Italy. But Italians could look back proudly to the endurance of Venice, the daring heroism of Rome. Garibaldi's name became a legend, a spell with which to conjure up armed men when the time should be ripe: and men could look to Piedmont and its King as the champion of Italian liberty.

In Piedmont Charles Albert abdicated in 1849 in favour of his son Victor Emmanuel: and the name of the third great man to whom Italy owes her unity is that of his chief minister, Count Camille de Cavour. Cavour set himself first to make Piedmont a model state, free and prosperous, so that other Italians would be willing to join it when the time came. He gave it a Parliament and a system of government like that in England, which he had admired and studied, and he really governed by the will of the people. "I always feel strongest when Parliament is sitting," he wrote to a friend. Next he set himself to find a military ally in Europe who would be a match for Austria.

France was the ally, under Napoleon III (for Louis Napoleon had become Emperor of the French.) In 1859 Piedmont and France went to war with Austria. They won Lombardy. But Napoleon III did not keep his promise to free Italy "from the Alps to the Adriatic." Tuscany, Parma, Modena and part of the Papal States had thrown off their rulers, and chose to join Victor Emmanuel's kingdom: England supported them, and the two emperors did not prevent the union.

Then came, with Garibaldi in 1860, the greatest adventure in the romantic story of the uniting of Italy. The Sicilians had risen against the King of Naples: and Garibaldi and his thousand "Red-Shirts," the volunteers who had joined him, went to their help.

The exploit looked madder than the defence of Rome: the odds against Garibaldi were a hundred to one, if we count them by armed men. Patriot volunteers, however, joined him from all parts of Italy. In May he and his "Thousand" came to Sicily from Genoa, in two English steamers, in August he was "Dictator" in the island, in the name of Victor Emmanuel, and was crossing again to conquer the kingdom of Naples.

In Naples there was almost no fighting; King Francis fled: and on September 7th, 1860, Garibaldi entered the capital amid the tremendous enthusiasm of the people.

Garibaldi talked of Rome as his next goal—Rome which all Italians felt was the true capital of Italy. But Napoleon III protected Rome; and Cavour and Victor Emmanuel knew that Italy must not quarrel with France. So the peoples of Naples and Sicily chose to become part of Victor Emmanuel's growing kingdom. But Venice, in the hands of Austria, and Rome, had to wait for their place in united Italy until another country (Germany) had found her unity, and could give Italy the alliance she needed.

§ 3

Germany after 1815 was scarcely more united than Italy. She had a "Diet" or assembly to which the states sent representatives, but which had no power to enforce its decrees, and the Emperor of Austria, and the kings of Prussia and the other states practically ignored it. German unity, however, like Italian unity, was to be reckoned with and was filling the minds of people from the Danube to the Rhine.

Though Austria was the leading power in Germany, the first link was forged by Prussia, and Austria was outside it. It was a Commercial League called the *Zollverein*, by which duties were paid on foreign goods at the boundaries of Germany instead of at the frontiers of its different states.

Germany, too, had her "Year of Revolutions" in 1848. As in Paris and Vienna and Prague and Milan, so in Berlin, students and workmen rose demanding liberty, equal laws, a free press and the right of free speech and political discussion, and a representative Government. For a few months a revolutionary assembly sat in Berlin; it was, however, put down by military force, for like Metternich, the Prussian King held that everything must be done for, and nothing by, the people.

In 1849 the Diet at Frankfort offered the King of Prussia the leadership of a united Germany, but he would not accept it from democrats. "Whoever wishes to rule Germany," was the reply, "must conquer it, and that cannot be done by phrases." Prussia's plan for making a united Germany was different; it is summed up in the words of the great Prussian minister, Bismarck:

"Not by speeches and majority votes are the great questions . . . decided—that was the great blunder of 1848 and 1849—but by blood and iron." The Prussian army was to make Prussia the ruling power in Germany.

Prussia had now become the rival of Austria and was determined to overthrow her authority in Germany. She therefore forced a quarrel with her great neighbour and in the "Seven Weeks' War" (1866) completely defeated her. Italy, as the ally of Prussia in this war, recovered Venice.

Prussia now became head of a League of North German states; and another step was taken towards a united Germany which Bismarck, the great Prussian Minister of State, desired very strongly. To help this forward, he provoked a war with France, believing that in war he would secure the conditions for the successful union of Germany.

The Franco-Prussian War of 1870-1871 had three

[Emery Walker

Napoleon III.

important results in Europe. It ended the reign of Napoleon the Third, and re-established the *French Republic.* The withdrawal of the French garrison protecting the Pope allowed Rome to become Victor Emmanuel's capital, and at the same time the capital of the kingdom of a *united Italy.* And on January 18th, 1871, William I of Prussia, in the palace of Versailles, was proclaimed Emperor of a *united Germany.*

In the nineteenth century, Germany, like France, had her social reformers and men of ideas, as well as her soldiers. While, however, Louis Blanc's plan of national workshops failed when put into practice, the theory of the German, Karl Marx, which was never put into practice in his lifetime, has influenced the ideas of some social reformers from his day to our own.

In 1849 Marx's friend, Engels, was in England, looking into the conditions of the English working classes in the factories and industrial towns. The book Engels wrote, and his observations, showed that there were still bad conditions for many of the workers in the industrial towns, which Factory Acts and Parliamentary Reforms had not yet been able to remedy; and it seemed to prove to Karl Marx that industry was wrongly organised, since he thought that an employer could always exploit his workmen by paying them less in wages than they were giving to him in their work.

In 1867, while Prussia was winning her empire by the sword, Karl Marx produced his famous book. *Capital,* he called it. Capital is the money, the buildings, the machinery and the raw material which are being used in a business. Marx felt that whoever owned this capital had an unfair advantage over the workmen. Why, argued Marx, should there be any private capital at all? Why should not all industry be organised by the

State, the State the only employer, and every labourer, whether with brain or hand, a State servant, and a sharer of the State profits ? He took it for granted that the State could do these things successfully.

As long as there were two groups in a nation, said Marx, " Capital " and " Labour," there would be class-war. The employer would always be wanting to exploit his men, the workmen suspecting the employer of unfairness, and envying him his wealth even though the work could not go on without it. *Communism*, his plan of state control and sharing profits in common, he proposed as a way out of the difficulty.

Compared with France and England, Germany, to the middle of the nineteenth century, was a poor and backward country. We have seen, however, that by 1871 she had conquered both Austria and France, and that the large number of separate German states had been formed into a united Empire under the leadership of Prussia. Let us see briefly how this newly united country rapidly grew into a wealthy manufacturing and trading nation, one of our richest customers and a most successful rival in the struggle for trade in other parts of the world.

First of all, as we have seen, a Commercial League, which in 1852 removed all customs duties between the separate states, enabled trade to flow freely throughout all Germany. Then followed improved transport. The river Rhine was deepened in its shallow places and made to carry barges very many times larger than could travel on English rivers or canals. Other rivers were similarly improved and canals were cut till Germany secured a very fine system of water transport. Railways followed and were built rapidly.

Then a very important discovery was made. Coal and iron were both necessary for the building up of great industries in Germany, as elsewhere. Coal she had in plenty, but her great iron ore deposits in Lorraine were mixed with phosphorous, and no one knew how to purify this ore on a large scale. About 1860, a greatly improved steel-making process, known as the Bessemer process, was introduced in England; but much English ore, like the Lorraine, was also found mixed with phosphorous and was quite unsuitable for use by the new method.

Many chemists set to work on this problem. Finally, two young chemists, Gylchrist and Thomas, experimenting in the Blaeavon Iron Works in Wales succeeded. In 1879 they gave a public demonstration of their method, to which ironmasters came from Germany, France, Austria, and even the United States. An extremely important result of their work was that the large iron ore deposits in Germany now became of great value, and with German coal helped to make possible the wonderful iron and steel and engineering industries which have grown up there in the last fifty years. It is interesting to think that these young English chemists played such an important part in making these things possible.

Let us remember one further and very important point about this rapid rise of modern Germany. Her people have great zeal for education. Many thousands of students are engaged in studying science in German universities and in thinking out ways of making use of their knowledge in industry; at the same time, highly skilled and competent workers are being trained in special trade schools and in day continuation schools where large numbers continue to attend for a day or so each week until they are about eighteen years of age.

CHAPTER XV

WORLD HISTORY: EAST AND WEST

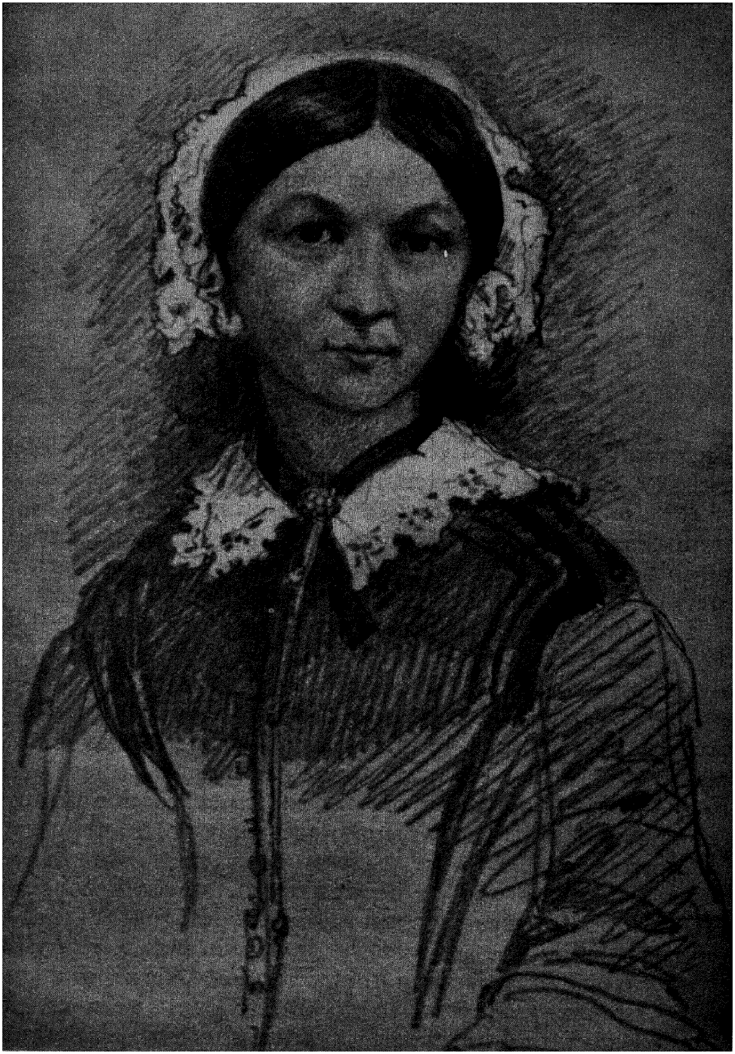
Florence Nightingale; the East Awakens; Lincoln and the U.S.A.

§ 1

THE middle years of the nineteenth century were filled with unrest and violence. Hardly had the tumults of 1848, the year of revolutions, died away and some hope of international goodwill been raised by the great trade exhibitions than a series of wars broke out in various parts of the world which lasted for the next ten years.

The first was the Crimean War (1854-1856). The real cause underlying this was fear in Western Europe of the growing power of Russia.

The Russian winter caused hideous suffering among the troops as it had in Napoleon's Grand Army half a century before, and mismanagement of supplies from England made matters worse. Medicines, food, ammunition were sent to the wrong places or were so damaged in transit that they were useless on arrival. Bales of wet rotting blankets had to be destroyed, a whole consignment of boots were sent out all for the left foot instead of in pairs, while the state of the hospitals was too terrible to describe. It was then that Florence Nightingale insisted on being allowed to go out to organise a proper nursing staff, and her work was little short of miraculous.



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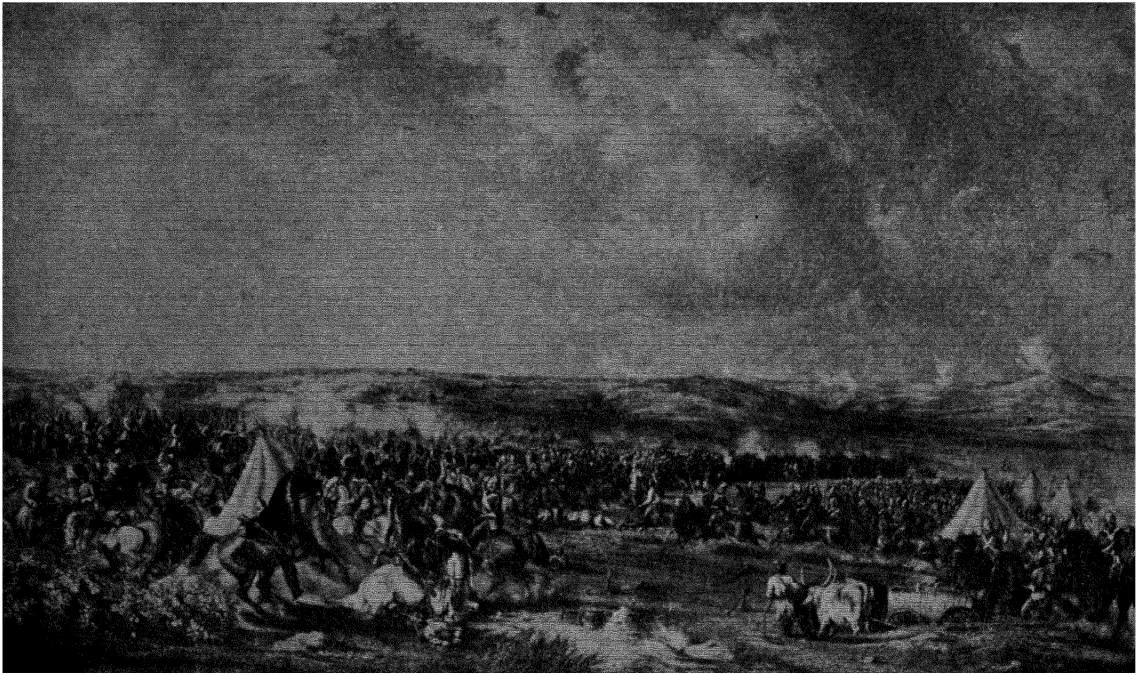
Florence Nightingale, the " Lady with the Lamp," who did such wonderful work among wounded soldiers during the Crimean War.

Florence Nightingale, the daughter of a wealthy Englishman of good family, was born in 1820 in that Italian city after which she was christened. Her childhood was spent in her father's country houses in Derbyshire and Hampshire, with an occasional visit to London. As a tiny child her favourite game was to run a " doll's hospital," and as she grew up she read every medical book she could secure, and determined one day to be a nurse. Such an ambition in a gentleman's daughter was regarded as eccentric and indeed shocking by Victorian society. Her parents forbade it, and it was very unusual for an unmarried girl to dispute her parents' decisions in those days. This gives Florence Nightingale's career an additional interest as one of the first big steps towards the freedom of women. For, in spite of her parents, and without quarrelling with them, she managed to go through a nursing training and became the matron of a nursing home in Harley Street, where she brought order out of chaos.

This was in 1853, the year before the Crimean War began. It was the first war in which newspaper correspondents were sent to the scene of battle, and their reports of the terrible mismanagement and suffering sent a wave of indignation across England. In answer to the public outcry for nurses to be sent out, Sydney Herbert, the Secretary of State for War, accepted the assistance of Florence Nightingale, whom he had known since she was a girl. On October 21st, 1854, Miss Nightingale set out with ten Roman Catholic nurses, eight Sisters of Mercy, six nurses from St. John's Institute, and fourteen hired nurses from the English hospitals—a little band of thirty-nine women to deal with the dying thousands in the Crimea.

They arrived at Scutari, the biggest military hospital,



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The famous " Charge " at the Battle of Balaclava.

the day before the battle of Inkerman—to find many of the wounded from Balaclava still uncared for. Moreover, the hospital was dark, unspeakably dirty, ill drained, and practically without any of the necessary medical equipment.

Florence Nightingale could be very tender to the wounded, but she had a will of iron, a scathing tongue, and a magnificent capacity for organisation. Within six months, backed by the War Office and assisted by money raised by *The Times* newspaper, she had clean, well-ordered and well-equipped hospitals running, and had reduced the death-rate among the wounded from 42 per cent. to 2 per cent. She was often on her feet for twenty hours a day, and she herself caught (and nearly died from) the Crimean fever. Nor did she stop working when peace was made in 1856. Through her the whole antiquated method of army medical service was gradually reformed, hospitals in England improved and nursing raised from "a penance, a self-sacrifice or a woefully ignorant and unskilled occupation" into an honoured vocation.

It is a curious thought that Florence Nightingale and Armstrong, the armament maker, should both have gained fame and distinction during the same war, the one through saving life, the other through inventing means to destroy it.

While Florence Nightingale worked in the Crimea, William Armstrong, the inventor of hydraulic machinery, had been experimenting in Newcastle on a new form of field gun. The old artillery was clumsy and inaccurate and very difficult to move. Armstrong succeeded in producing the rifled-cannon, a gun with the barrel grooved inside in such a way that the shot was given a rotary or spinning motion as it flew, which greatly

Florence Nightingale at Scutari

[After the picture by Jerry Barrett

increased its speed, range and precision. He also used wrought iron and steel instead of cast iron for his guns, and made long shells with a flat base and tapering point instead of the old round cannon balls. The Armstrong gun, with its accuracy, length of range and lightness became famous throughout the world and played its part in all wars which followed. Later, Armstrong devised a means of counter-acting the recoil of a gun when fired, and of mounting the gun on a swivel so that its direction could easily be altered. The first modern battle cruisers, fitted with these guns and armoured with steel plates, were made at his Elswick works in Newcastle.

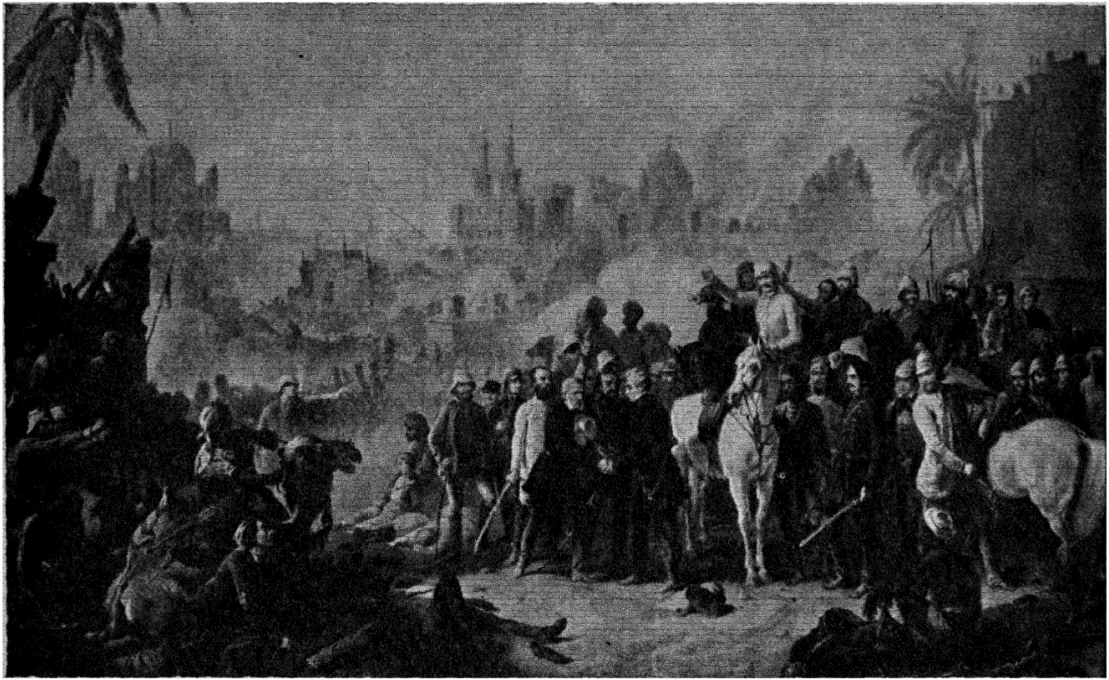
§ 2

In 1857, the year after the Crimean War was terminated by the Peace of Paris, mutiny broke out in India. There were many causes. One was a native prophecy that the English should be driven out of India one hundred years after the battle of Plassey, Clive's great victory in 1757. A much more important one was the issue of greased cartridges with the new Enfield rifles. It was said that the grease was the fat of cows and pigs; the Hindoo worships the cow, while to the Mohammedan the pig is unclean, so that sepoys of both religions refused to touch the new cartridges. Again, the failure of the first Afghan war had shown that white troops were not always victorious and the removal of British soldiers to the Crimea had left six sepoys to every white man in the Indian Army. When wild and exaggerated stories of the difficulties of the Crimean campaign spread over India it was felt that the prophecy was true, that Britain's day was over, and the sepoys rose.

Those stationed at Meerut poured into Delhi, where the last of the Mogul Emperors, an old, old man, lived under the protection of Britain. His petty court had long been the centre of discontent and plotting, and he let the mutineers proclaim him Emperor of India. The mutiny had become a revolution, but it was confined to the valley of the Ganges. Even there some of the native troops, the Sikhs and Ghurkas, remained loyal and fought gallantly beside the British, while many acts of self-sacrifice and heroism were performed by native servants.

But terrible things happened as well. At Cawnpore the small British garrison surrendered under a promise from Nana Sahib, one of the rebel leaders, of safe conduct to Allahabad. When they were embarking, unarmed, in the boats to go down the Ganges, Nana Sahib had the men shot down in cold blood and took the women and children captive. Later, when Henry Havelock passed through Cawnpore on his way to relieve Lucknow, his soldiers saw a thing which roused them to a frenzy of revenge. The rebels had fled before them, but in the Well of Cawnpore were the mutilated bodies of over a hundred women and children. Havelock pressed on and smashed his way into Lucknow to relieve Sir Henry Lawrence, only to find that Lawrence was dead and that so many of his own men had been killed in the terrific fighting that, once in, they were not strong enough to break out again. The siege was raised, later, by Sir Colin Campbell and his Highlanders.

Meanwhile Delhi was defended by 30,000 sepoys and surrounded by a thin line of 5000 British. But Sir John Lawrence, brother of Henry, called the Lion of the Punjab, collected a big force largely through sheer strength of personality, joined the 5000 and stormed and



[Mansell

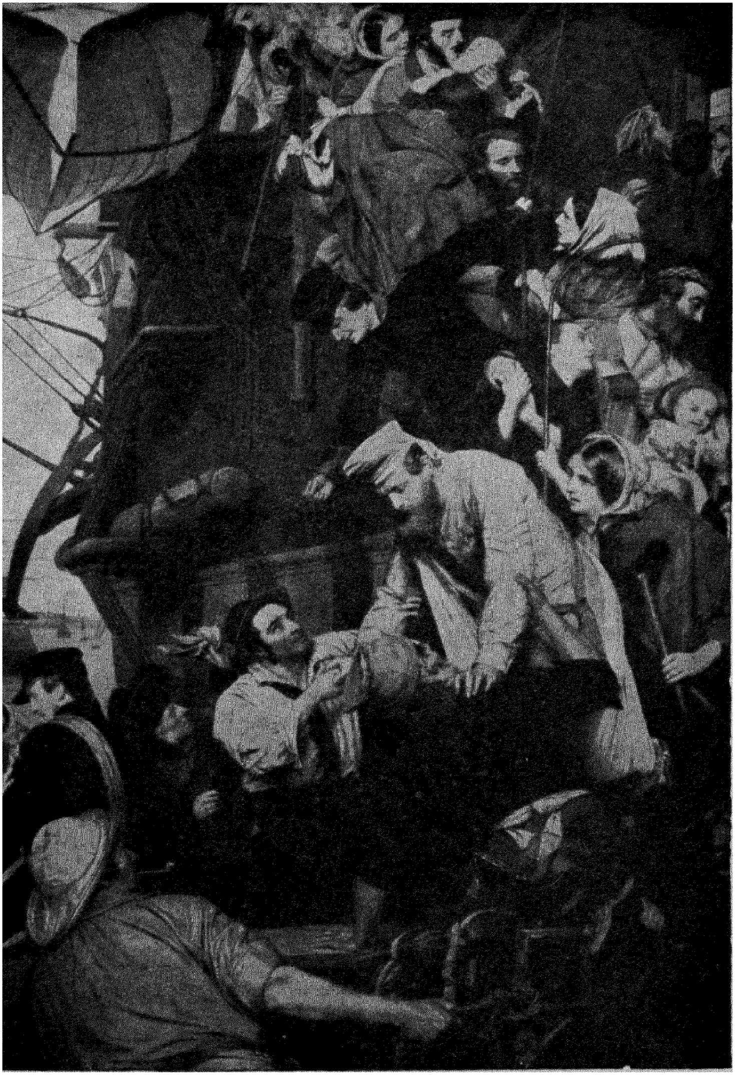
The Relief of Lucknow, and the triumphant meeting of Havelock, Outram, and Sir C. Campbell.

recaptured the town. With the capture of Delhi and the relief of Lucknow the power of the rebels was broken. Some risings still took place both in Bengal and Central India, but they were suppressed and the supremacy of Britain re-established. One of the last of the rebels to give in and one of the " best and bravest of their military leaders," was a young princess, the Rani of Jhansi.

The result of the Mutiny was to transfer to the Crown the powers of the outworn East India Company. An era of the peaceful development of the country followed. The great work of Lord Dalhousie, who had been Governor-General from 1848 to 1856, was taken up again. Railways, ports and irrigation canals were built, the telegraph and the postal service established, and the scientific cultivation of tea, rice and silk progressed along the lines he had laid down. Trade increased rapidly, carried by the beautiful " Wallside " sailing clippers, boats built for speed, with the long clean lines of a modern yacht and a great three-masted press of canvas. They were called " the greyhounds of the sea," and touched the pinnacle of wooden shipbuilding. In time, however, even their speed was not enough, and they had to make way for iron and steam.

§ 3

India was not the only country awakening in Asia. In 1638 Japan had closed her harbours to Europeans. No Japanese could go abroad and no white men could enter the country. For two hundred years Japan dreamt among her cherry blossoms, living up to her part in " the unchanging East." Then she was rudely roused by a hustling American, Commodore Perry, who in 1853



[Henry O'Neill, 1857

Returning from the Indian Mutiny.

forced a commercial treaty upon her. Immediately traders of all nations began to frequent Japanese waters.

Never in all history has a country developed so quickly as Japan. When Perry went there it was a mediæval country; Fifty years later not only had feudalism been abolished and a Parliament set up but also roads and railways had appeared, factories were working busily, education was compulsory, great ports were run on the most modern lines, and an army and navy trained in European methods had successfully beaten China (1895) and Russia (1904).

The vast, ancient land of China was also changing, though perhaps here " progress " is a foolish word to use. For three thousand years before, when Britain was peopled by naked, clay-smeared savages, China had reached an advanced stage of civilisation. Before the empires of Persia or Greece or Rome were born the Chinese wrote poems and made exquisite china, fashioned curious jewels and painted beautiful pictures. It was the Chinese who first spun silk, the Chinese who invented paper and printing and had the earliest newspapers in the world. They discovered gunpowder and the compass ; two hundred and fifty years before Christ they built roads and cut canals—it was natural that they looked upon European traders who came round the Cape of Good Hope to them in the sixteenth century as barbarians. But the traders, whether European or later American and Japanese, got a firm foothold in the country, and the nineteenth century saw a series of small wars followed by " concessions," such as that of Hong-Kong to Britain (1839). From then on an enormous commerce sprang up between China and the world, until Hong-Kong is to-day among the greatest of ports.

§ 4

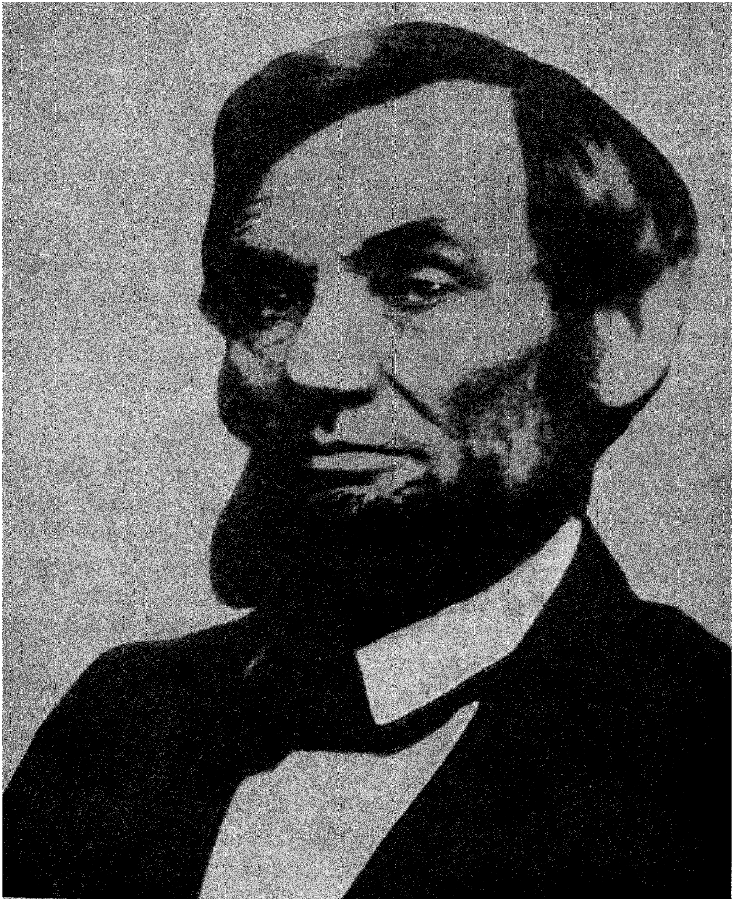
When Britain acknowledged the independence of the American colonies and the nation of the United States was born, only thirteen states were concerned. They lay along the Atlantic seaboard with the Alleghany Mountains forming a natural boundary behind them. During the nineteenth century the country gradually expanded in territory, population and industries right across the continent to the Pacific. In 1803 Napoleon, to raise money for his European wars, sold the French territory of Louisiana to President Jefferson. This added twelve new states to the Union. Sixteen years later the Americans also bought Florida from Spain. In 1845 they annexed Texas, a Mexican province. Mexico, not unnaturally, objected. America went to war and in one short campaign added lands greater than the whole of France, Italy and Spain by her Mexican conquests. These became the States of California, Colorado, Nevada and Wyoming. The following year, in a dispute over the Canadian boundary, she gained from Britain the states afterwards named Idaho, Oregon, and Washington.

Thus, when the American Civil War broke out in 1861, the country stretched from ocean to ocean and from the Canadian boundary level with Lake Superior to the Mexican boundary on the thin stem of Central America. The Northern States saw that in the close unity of this vast territory lay the strength and future of the country; the Southern States wished to break away from the Union, and declared themselves the Confederate States, a separate nation. The Northern States (who would be scarcely affected) wished to abolish slavery, as it had been abolished throughout the British Empire thirty years before; the Southern States, whose great plantations were worked entirely by slave labour, said such an act would mean their ruin.

One of the greatest of all Americans, Abraham Lincoln, was then President of the American Republic and leader of the Northern, or Federal, States. He was born in Kentucky in 1809 and spent his boyhood in the backwoods of Indiana, where life was rough in those days. His home was a log cabin in the wilderness, his schooling poor and fragmentary. But his mother, who died when he was nine, had taught him to read and he was fond of books as well as of wrestling and running, both of which he did very well. As he grew up his strength of character impressed all who knew him, and at twenty-five he was elected a member of Congress. His courage and persistence finally prevented the Confederates from splitting up the great country he loved.

The civil war raged for four years (1861-1865), rolling over a vast area, backwards and forwards through the hills and woods of Tennessee and Virginia, and up and down the Mississipi. Stonewall Jackson and Robert Lee were the great generals of the South, Ulysses Grant of the North. Sympathies in Britain were divided. The upper class for the most part sided with the Southerners, who were more like themselves in habits and manners; the working class were unanimous for the North, partly because of their anti-slavery ideals, and partly because many working men in England had friends or relations among the people of the Northern States.

This opinion most of the workers continued to hold even when the Federal blockade of the southern ports caused the cotton famine which silenced the Lancashire



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Abraham Lincoln.

mills and brought suffering to thousands of English homes. For Lancashire at that time depended entirely on America for her raw cotton; so desperate was the need that many English merchants chartered fast steamers to run through the blockading squadrons, taking supplies to the Confederates and bringing cotton in return. But this blockade-running could not make any appreciable difference in the stoppage of supplies. Factories were closed down or opened only for a few hours a week; thousands were thrown out of work and faced with starvation. It was then that experiments were made in cotton-growing in various other countries, in order that Lancashire should not be completely dependent on the supplies from America. The crops in India and Egypt were the most successful and had a profound effect upon both countries as we shall see later.

Peace came at last in America with victory to the North, and slavery was abolished. Lincoln, who had worked without ceasing and held undeviating to his purpose of keeping the States bound in one great nation, did not live to see the signs of the struggle smoothed away. Within a few days of signing the peace he was murdered by a madman in a theatre at Washington (April 14th, 1865).

His work, however, was not in vain, for to-day the "Stars and Stripes" flutters over forty-eight states, a united country twenty-five times as big as the British Isles and commercially the most progressive in the world.

This staggering growth of the United States of America into the position of the richest and most vigorous trading and manufacturing country in the world, has, like the growth of Germany, provided an immensely wealthy customer for goods and a very powerful competitor for foreign trade. Since the rise of these two countries Britain has had an ever harder task to keep her trade with the rest of the world, and the growth of the United States has exercised great influence on the prosperity of merchant, manufacturer and farmer in Britain. We may look briefly at the main facts in this wonderful development.

We have already seen that the victory of the Northern States maintained the Union. After this war there was a period of railway building on a great scale. These railways opened up the fertile lands of the Mississipi Valley and the huge tracts of prairie in the central states. Wheat grown on these virgin lands poured into Europe and especially into England.

Then both trains and steamers in which meat could be carried long distances in refrigerators enabled chilled and frozen meat to be sent abroad. Thus wheat from the United States, and later meat from the Argentine and Australia, made things very hard for English wheat growers and for cattle breeders, but gave very cheap food to the English workers in the towns.

These same railways linked up the vast iron deposits of Lake Superior with the coalfields of Pittsburgh, and great industrial leaders such as Andrew Carnegie were able to build up an iron and steel industry of immense size. In the years before the Great War, many thousands of vigorous and ambitious young emigrants from Great Britain and Ireland, from Germany, Poland, and the countries of Central Europe, streamed into this new " land of promise." By hard work they have made use of the immense natural riches of America and helped to found and develop one of the greatest industrial and commercial nations of the world.

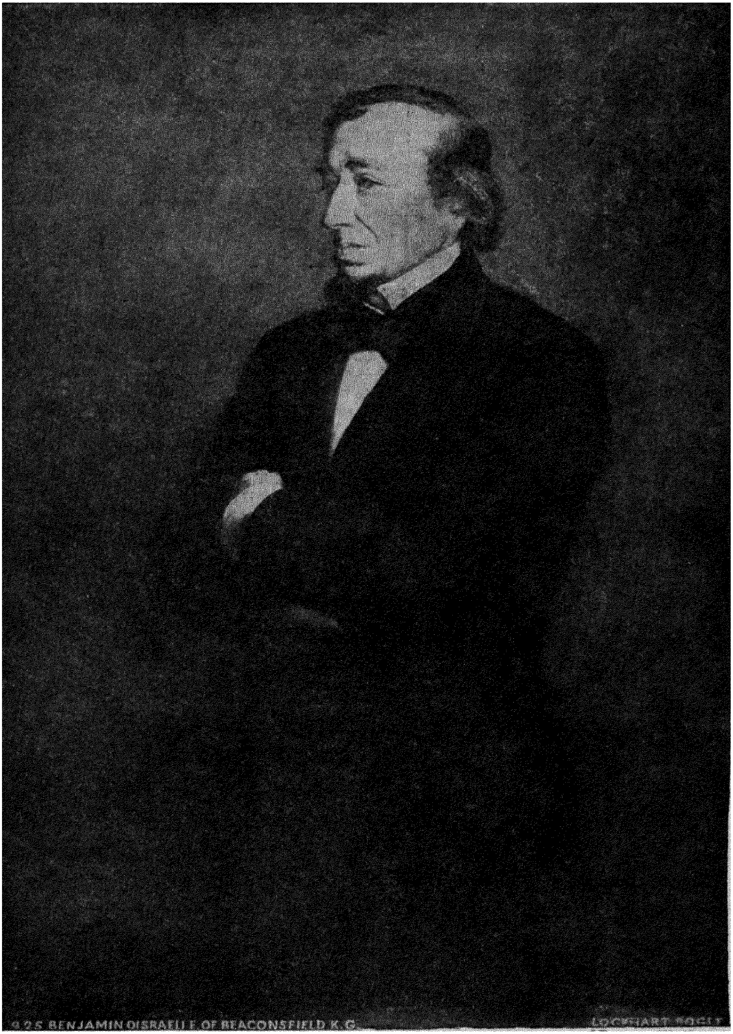
PART V

CHAPTER XVI

DISRAELI AND THE ARTISAN

THE new spirit among the workers, which showed itself in the model trade unions and the co-operative movement, was steadily growing in England. The unions of the skilled workers co-operated, helping each other, so that when the builders went on strike in 1859 and their masters refused to bargain with them, subscriptions of over £20,000 were sent from other unions, enabling the builders to hold out until they could get their grievances heard. The Trades Committee, which had first met to consider the help to be given to the builders, went on meeting under the name of the London Trades Council (1861). There, the secretaries of all the most important unions worked in harmony. One of their great endeavours was to get the vote for the working man, believing that many of his difficulties would pass if he were able to vote at the election of members of Parliament.

The two greatest statesmen of the day who were faced with this new spirit were Benjamin Disraeli and William Ewart Gladstone. They presented a curious contrast. Disraeli was the son of a Jew who had come to England in the middle of the eighteenth century. This elder Disraeli was a great collector of books, and Benjamin from his childhood had the run of a library filled with a


925 BENJAMIN DISRAELI E. OF BEACONSFIELD K.G.
LOCKHART BOGLE

[*Emery Walker*

Benjamin Disraeli, Earl of Beaconsfield.

wide and curious assortment of knowledge. Gladstone, on the other hand, had the education which was usual for well-to-do young men at Eton and Oxford, where he did brilliantly, taking the highest honours in both Classics and Mathematics. Gladstone, as we have seen, was returned to Parliament for the Duke of Newcastle's "rotten" borough of Newark in 1833, when he made his first speech, against the abolition of slavery. He spoke clearly and forcibly, but plainly and simply. Disraeli, when he made his maiden speech in 1837, was dressed in "a bottle green frock coat, white waistcoat, across which glittering chains were hung, black stock, large fancy pattern pantaloons, and varnished shoes." He had "a white face, intensely black eyes, and coal-black hair combed away from the right temple to fall in clusters of small, well-oiled curls over the left cheek." He spoke with such an oriental richness of flowery images that the House refused to take him seriously and laughed him down. Yet Disraeli, the witty, dazzling Jew, became the leader of the great Conservative landowners, while the more steady and learned Gladstone fought against him for the Liberals.

In the years following the formation of the London Trades Council the Conservatives were in office, and it was Disraeli who carried the second great Parliamentary Reform Bill (1867), and gave the vote to the artisans or workers in the towns. Every householder who had lived for twelve months in the same town and paid poor-rates was enfranchised. Only the agricultural labourer now remained voteless. Gladstone had already introduced a more cautious reform bill which Disraeli had opposed. Then an enormous workers' meeting in favour of reform was held in Hyde Park, where popular feeling ran so high that the proceedings ended in a riot. Disraeli saw that reform would have to come, and, always frankly ambitious, he decided that he and his party should get the credit of it instead of the Liberals. It is also characteristic of him that having come to this decision he did not waste energy on details but passed a sweeping measure which admitted exactly twice as many new electors as Gladstone's would have done. The Conservatives were staggered, and wondered where Disraeli was leading them; they regarded the change as a "leap in the dark," but they consoled themselves with the thought that they had "dished the Whigs." Disraeli chuckled; Gladstone was deeply shocked.

Disraeli's next measure was the Masters and Servants Act (1867). The terms "master" and "servant" themselves show the idea held of the relation between employer and employed. Indeed up to 1867 the master who broke a contract with an employee could only be sued for damages, while the servant who did the same was held guilty of a crime and could be imprisoned. Again, a servant charged with a criminal offence was not allowed to give evidence, but an employer was; the servant might also be tried by a single justice of the peace, who, probably an employer himself, was liable to be biased in favour of the master. The Masters and Servants Act did much to remedy these inequalities.

The year 1867 also saw a Royal Commission appointed to inquire into the position of the Trade Unions, which were accused of being "aggressively warlike organisations." This inquiry took place because people were disturbed by acts of violence which were committed by some trade-union members. These had been most serious in Sheffield, where members of several small unions seriously ill-treated men in their trades who would not join their unions. Tom Hughes and Frederick Harrison, two well-known writers, appeared before the Commission and produced plenty of evidence to show that most trade-unionists were steady, law-abiding citizens and that the large and important unions were in no way responsible for the outbreaks of violence which had occurred. The Commissioners, as a result of their evidence, reported in favour of the unions.

[From the V. & A. Museum, S. Kensington

A model dressed to show a fashionable evening gown of about 1865. The top part that is cut round over the skirt was called a "polonaise": the lady wears mittens.

Disraeli's ship of state seemed to have set sail in fair seas, but it foundered suddenly and swiftly on that old and dangerous Parliamentary reef, Ireland. The Fenians, an Irish secret society plotting to separate Ireland from England, committed a series of outrages in England itself (1868).

Two Fenian prisoners, who were being driven in a prison van through Manchester, were rescued in broad daylight, the policeman in charge of them being shot dead. Five of the rescuers were caught and tried, three were hanged and two imprisoned. The wall of Clerkenwell prison was then blown up with gunpowder in the hope that the two Fenians would escape, and twelve people were killed in the explosion.

Gladstone insisted that the Government must get to the root of the matter, and remove the causes of the discontent from which such societies as the Fenians sprang. Disraeli dissolved Parliament to let the new electorate decide between Gladstone and himself; a Liberal majority was returned to Parliament, and Gladstone became Prime Minister (1869).

To Gladstone the three sources of Irish unrest were an alien Church, the land laws, and the lack of a proper educational system. The Church question was the first he attacked.

The Established Church of Ireland was Protestant: more than three-quarters of the Irish were Roman Catholics. Moreover, the Protestant Church had both rich revenues and close alliance with the British Government. It was therefore cordially hated. Gladstone carried a Bill in 1869 disestablishing the Irish Church, that is to say, severing its tie with the British Government and making it a self-governing body. The disestablishment also reduced its revenue by rather more than half, and the money thus gained was set aside for "the relief of unavoidable calamity and suffering not touched by the poor law."

Gladstone then turned to the land question, which concerned nearly every one in a country where there were few manufacturers. In old tribal Ireland the land had been the property of the community. There were headmen but they did not claim the ownership of the

[*From the V. & A. Museum, S. Kensington*

Here is a lady of about 1870, the time of the Franco-Prussian War, elaborately attired in silk, with tassel trimmings and flounces.

land: they were simply overseers managing it for the good of all. The English conquest introduced English ideas of property, by which the headman, or landlord as he became, was regarded as the sole owner. The Irish tenants, however, still clung through the centuries to the view that the land belonged to them equally with the landlord. But the landlords took every advantage of the change.

Unlike the English landowner they supplied nothing but the land—the farm and outhouses, fences, gates and drains being constructed by the tenant. If the tenant did not do these things the landlord could evict him, and if he did do them and worked hard, improving the value of his holding, the landlord could put up his rent, and evict him if he refused to pay it.

Naturally this system discouraged the tenant from working hard as only the landlord profited by his labour. Everywhere slackness, misery and unjust evictions were the direct result. An English Commission appointed just before the Irish Famine (1845) reported that seven-tenths of the population lived in huts unfit for human beings. This did not apply to the province of Ulster in the north, which had different laws and was of different character from the rest of the island. In 1870 Gladstone carried an Irish Land Act, which he explained to the House, in a speech lasting over three hours. The main principle was that the landlord had to compensate a tenant for turning him out, and for any improvements he had made. This did not give the tenant very much greater security or protect him against raised rents, but it was the first step towards dealing with a serious question.

On Irish Education Gladstone was defeated, the scheme he drew up being thrown out by the Commons, but he did much for English education as we shall see in the next chapter.

CHAPTER XVII

GLADSTONE AND THE NEW DEMOCRACY

DISRAELI'S Reform Act had created a democracy; Gladstone set out to educate it. Up to 1870 not more than half of the children of England, who, when they grew up would be electors of Parliament, were receiving any education at all. Schools did not exist in which they could all be educated if they were poor, as we have seen from the lives of many great men who " rose from the ranks " during the Industrial Revolution. Some schools, of course, there had always been. In mediæval times they were sometimes attached to the monasteries. When these were dissolved some of the money was used to found such schools as Sherborne, Shrewsbury, Christ's Hospital and Tonbridge. They were at first open to all boys in their neighbourhood, but the vast majority of the children of the poor were sent to work almost before they could have learnt to read. The few whose parents did try to give them a little education went to " dame schools," where some old cottage lady " minded " them for a penny or so a week while the parents were at work. Books were much too dear to be used in such schools. The children had only a " horn book," a piece of cardboard with letters printed on each side, covered with pieces of transparent horn and framed with a little handle like a lady's looking-glass.

In the eighteenth century, Robert Raikes, a young

[Mansell

An early eighteenth century school.

man of twenty-two, who owned a printing works and newspaper in Gloucester, started the first Sunday Schools. The idea spread throughout Gloucestershire and far beyond, all over England, Scotland and Wales. Then a young Quaker called Joseph Lancaster, son of a poor shopkeeper in London, opened a day school in one big room in the Borough Road where "all who will may send their children and have them educated freely, and those who do not wish to have education for nothing may pay for it if they please."

This school cost very little because the young children were taught by several older ones called monitors. There was very little money to spare, and so the school had few reading books and no exercise books. Writing and arithmetic were done on layers of sand spread over the flat board desks; and there was often only one reading book for every twenty or so children. The pages had to be cut out and clipped on boards which one of the monitors held up in front of a group. Lancaster's school became so famous that George III sent for him in 1805 to hear about it.

In the next six years the British and Foreign School Society and the National Society were founded, which built and maintained schools and paid small salaries to teachers out of funds collected through voluntary subscriptions. But the State did not help these schools until 1833, when Parliament voted an annual grant of £20,000 for the building and maintenance of school houses.

In 1839 the grant was raised to £30,000 and a Committee appointed to see that where public money was employed the teaching was satisfactory. The great measure, however, came in Gladstone's first ministry when William Forster introduced the Elementary

Education Act (1870). Under this Act the State paid half the expenses of any of the existing schools which were willing to submit to Government inspection and were passed as efficient, while "Board Schools" were to be built wherever a majority of ratepayers agreed.

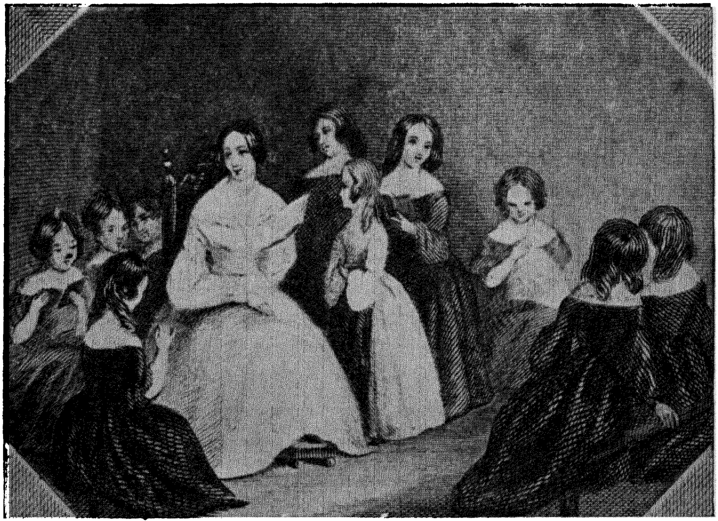
These schools were paid for partly out of the rates and partly by the State, the name Board School coming from the Boards controlling them which were appointed by the local Councils. The Act also provided that parents could be compelled to send all children between five and twelve either to these or other schools. This put an end to long factory days for very young children, and in time there would be no more grown men and women who could neither read nor write.

Between 1870 and 1890 the average school attendance rose from a million and a quarter to four and a half million. In 1891 another Act was passed making elementary education free of all expense to the parents.

Gladstone then attacked the question of secondary and higher education. Under him the system of secondary school scholarships was first discussed and the great universities were encouraged to send out lecturers, which, in some places, led to the founding of University Colleges in the big towns, and of classes for working men.

The position of working men was improved by both the Trade Union Act (1871) and the Ballot Act (1872). Prior to the first of these Acts, Trade Unions had no right to exist and could make no appeal to the law. If, therefore, a secretary or treasurer stole the funds of his union he could not be prosecuted. The Act made Unions lawful, and as a result enabled them to protect their money from dishonest officers. At the same time, the Unions were forbidden from attempting to coerce workers into joining or into taking part in strikes.

The Ballot Act (1872) conceded one of the points once demanded by the Chartists: vote by ballot or secret voting. Instead of recording their votes openly men now put folded slips of paper in a box, so that they need not suffer for their political opinions at the hands of their landlords or employers as they had often done previously.



[*From a contemporary print in the V. & A. Museum, S. Kensington*

A nineteenth century boarding school "for Young Ladies": the pupils would be mostly from well-to-do families.

The reform of the methods of the Law Courts was not forgotten. Three Acts, chiefly the work of a great Lord Chancellor, Cairns, were passed during Gladstone's ministry, setting up new, more just, and quicker machinery for legal administration. But Gladstone's greatest genius lay in finance. His budgets in the past, carrying "every stitch of Free Trade canvas," had done much to bring prosperity to the country by helping trade. In 1861 he had created the Post Office Savings Bank, a real help to the worker, and in the seventies he began to save public money through the reform of the Army, the Admiralty and the Civil Service.

At the Admiralty he reduced the work in the dockyards, the staff in the office, the number of officers at sea, and the number of ships in commission on foreign stations so much that many people thought he was endangering the safety of the country, and in 1873 the new First Lord of the Admiralty,[1] Viscount Goschen, refused to make any more cuts.

In the Civil Service his reforms were equally necessary and more successful. During the first half of the nineteenth century Civil Service posts were often given by members of Parliament to people who had votes or political influence, and whose friendship (and vote) they wished to gain. It was another form of the bribery by which Walpole had kept himself in power in the days of the Georges. The Government offices became proverbial for laziness and incompetence. " Heavy swells with long whiskers lounged in late and left early." In 1870 Gladstone's axe fell. By introducing competitive examinations open to all, he took away from ministers the power to give Government posts to their friends whether they were suitable for the work or not, thus the " heavy swells " were gradually replaced by men with training and ability, under whom muddle and waste were greatly reduced.

The same spirit was shown in the reform of the Army, which was carried out chiefly by Edward Cardwell. Until 1871 promotion in the army was by purchase: every officer had to buy his commission and then buy every step he took in rank up to that of Lieutenant-Colonel. There was supposed to be a definite rate for the sale of each commission, but in practice the scale was far exceeded, men making as much as they could out of, say, the sale of a Lieutenant's commission because they immediately had to spend what they made on buying a Captain's, and so on. This gave no chance to the poor man; he might be a better soldier than his superior officers but he remained a second-lieutenant because he could not afford to buy his way up. The abolition of purchase (1870) made it easier for men to win distinction in the army through merit instead of through money or influence, just as the abolition of patronage had made it possible in the Civil Service. The private's position was also improved; instead of having to enlist for twelve years he now remained only three years with the colours, and was then drafted into the reserve, where he could take a civilian post.

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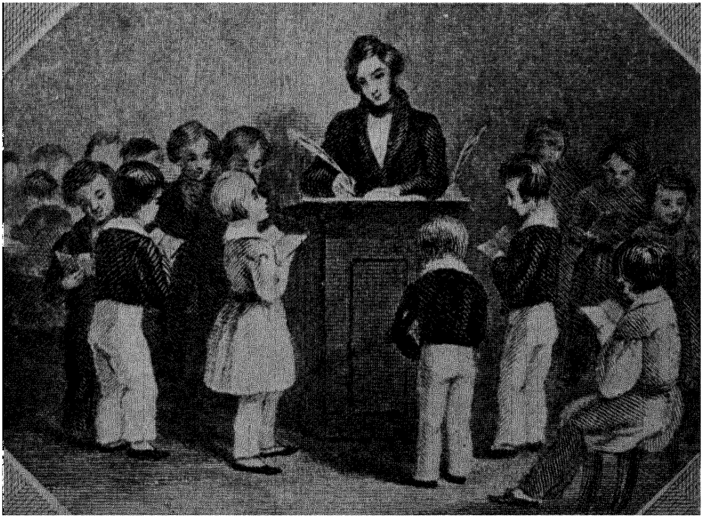
[1] This Minister is responsible for naval affairs.

This newly organised army was to be entirely under the control of the War Office, whereas before it had been under the control partly of the Secretary of State for War, and partly of the Commander-in-Chief. They had frequently been at loggerheads and wasted much time and money on their disagreements. Cardwell took the further step of encouraging the colonies to raise their own armies, while he gradually withdrew the British garrisons from the colonies. The economy of this step delighted Gladstone, and has since more than justified itself by the magnificent help the colonial troops gave during the Great War of 1914-1918.

These economies were somewhat counteracted by an indemnity which England had to pay the United States in 1872. During the American Civil War when the Northern States were blockading the Southern ports, the Southerners ordered a fast armoured cruiser from England. The *Alabama* was built at Birkenhead and harassed very seriously the Northern shipping. The Northerners having won the war, the re-united States claimed damages from England for all the *Alabama's* exploits, as England had broken her neutrality by letting the cruiser sail out of the Mersey. The Americans mentioned £400,000,000 or Canada and the West Indies as a suitable compensation. The affair, however, was submitted to an International Tribunal for arbitration, and the damages were fixed at £3,250,000, thus lessening Gladstone's careful savings.



[From a contemporary print in the V. & A. Museum, S. Kensington

An early nineteenth century "better class" school for boys.

In 1874 the Gladstone ministry fell, the question at issue again being Ireland. Having made no headway in primary education for the Irish, Gladstone turned to higher education and proposed the foundation of a national university, but it was not to teach history or religious subjects, about which there was such high feeling. Instead of pleasing everybody this compromise pleased nobody, the Bill was defeated, and Gladstone resigned. Many working men were dissatisfied with the Trade Union Act which Gladstone had passed. They wanted more freedom in managing their strikes than the Act gave to them. At the same time, many nonconformists thought that in his Education Act he had been much too generous in his treatment of the schools belonging to the Church of England. The Conservatives were, therefore, returned to Parliament with a large majority, and Disraeli became Prime Minister for the second time.

CHAPTER XVIII

THE GREAT SCIENTISTS

Davy, Pasteur, Lister, the Curies

THE value of the advance in scientific knowledge in the nineteenth century was incalculable in the help it gave towards the conquest of pain and suffering. A hundred years ago if a bad tooth had to come out there was no "laughing gas"; if a limb had to come off there was no chloroform; and nothing was known about the causes of such diseases as typhoid and malaria, the treatment for which was often hopelessly wrong. Countless persons died from wounds which would not heal because they were not clean, or not properly dressed, or were infected with germs which nobody knew anything about.

"Laughing gas" was known to Humphry Davy when he was a boy of nineteen. It was he who later started Faraday on his great career of electrical experiment. Davy was a keen experimenter himself; in fact his friends were always saying nervously "Humphry will blow us all up before long!" In the course of his experiments he tried the effect of breathing the laughing gas. He immediately fell into a deep sleep filled with confused dreams, such as you may have known yourself if you have ever been given gas by a dentist.

§

You knew what was going to happen, but Davy was amazed with the result. Later he showed that this gas could be used to take away pain in operations, but nearly fifty years passed before it was used for that purpose.

In 1847 an Edinburgh doctor, James Simpson, with two of his friends, experimented in taking the new chemical, chloroform. All three, at the same moment, slipped down unconscious under the dining-room table. A few days later Simpson used it for an operation, and as the patient felt no pain or shock, he was able to work longer than a surgeon had ever done before. The result was very successful. Until that day surgeons had to operate extremely rapidly, cutting off a leg in less than half a minute, for speed was the only hope of the patient being able to endure the pain.

Even after this important discovery there was still much to learn before surgeons began to feel confident that their operations would cure their patients. They found that in many cases, though the operation itself was successful, the wound refused to heal. Then it was discovered, through the aid of the microscope, that tiny poisonous germs were infecting these wounds. Many men have helped to unravel the mystery of germs, but the greatest of them all was a Frenchman, Louis Pasteur (1822-1895).

He was the son of a sergeant of Napoleon's famous 3rd Regiment—" the brave among the brave "—who, with the coming of peace, had settled down to the life of a tanner in the little town of Dole in Franche Comte, where Louis was born. During his schooldays the family lived at Arbois, where he attended the school attached to the college and finally the college itself. He was not considered a brilliant scholar, but by hard work and accepting the position of pupil teacher at a salary of £12 a year he managed to take his preliminary degree and win his way to the University in Paris. There lectures, books, experiments, crowded his days with chemistry until 1848, the year of revolution, when he enlisted in the Garde Nationale and laid all his slender, hard-won savings on one of the "Altars of the Fatherland" ("Autels de la Patrie") which were set up in the streets.

On his return to the study of chemistry he made rapid progress, solving a problem concerning certain acids which had baffled Biot, his professor, for thirty years. This brought him to the notice of the new Government, and he was appointed professor of physics at Dijon. Such a post, with its routine work and long teaching hours, gave no scope for Pasteur's special gift of research, but as ever he worked hard, and in 1849 was made professor of chemistry at Strasbourg.

There he met and married Marie Laurent, who to his death inspired him with hope and confidence, and fresh energy for his work. Researches took him to Leipzig, Vienna and Prague, but his greatest work was begun as Professor and Dean of the new Faculté des Sciences at Lille, the centre of a country of distilleries. It was here that he studied the germs which soured milk and beer, and wrote a paper which is said to have "fixed the date of the New Learning." He proved that fermentation, decomposition and putrefaction were "acts of life, and in the absence of life cannot take place," that is, "germs cannot come into the world without germs, without parents like themselves." This was the fact upon which Lister, the great Englishman of whom we shall speak shortly, based his "antiseptic" surgery. ("Septic" comes from a Greek word meaning putrefying.)

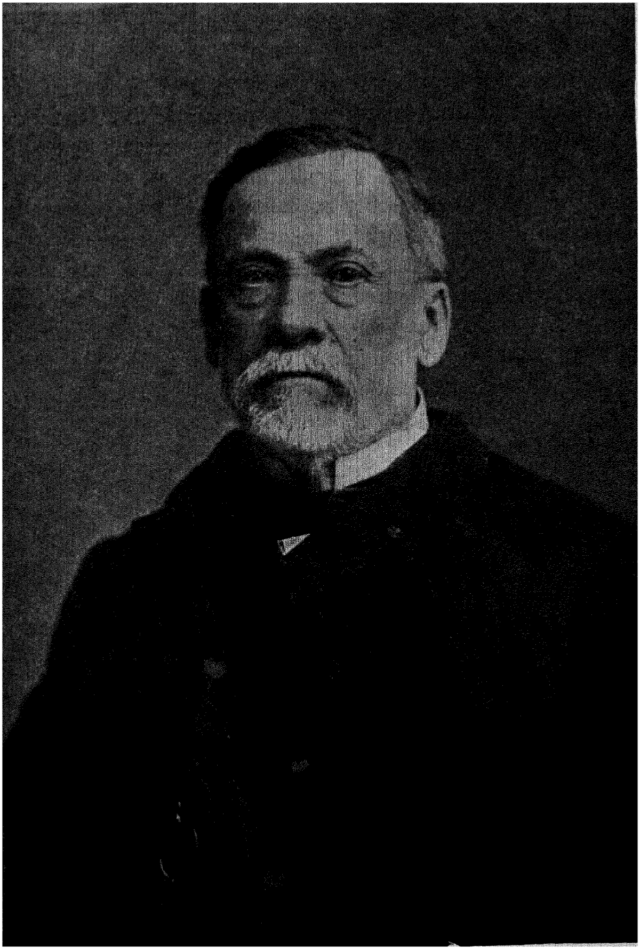
Having made this discovery, which now seems so obvious but which was an immense advance of knowledge, Pasteur showed how the "parent germs" could be destroyed and substances kept in such a way that new germs could not enter them. He did much to improve both the wine-making and beer-making of France, showing yet another way in which science could help industry. He then worked upon the mysterious diseases of silk worms which were destroying the important silk industry of his country. In the face of scientific difficulties and the incredulous mocking of the silk experts, he discovered both the germ and the cure of the two diseases and literally saved the industry.

Meanwhile the national tragedy of the Franco-Prussian War (1870) crashed across his work and the personal tragedy of the loss of his three little daughters, who all died within five years of each other. But Pasteur never gave up. He attacked the problem of anthrax, a disease which was then killing 5 per cent. of the cattle and 10 per cent. of the sheep of France.

As long before as 1796 an English doctor, Jenner, had passed a mild form of smallpox from cows to human beings with the result that the people were afterwards immune for some time from a real attack of the disease. That is to say he "vaccinated" them. But this had been regarded as a thing which could only be done concerning smallpox. Pasteur now proved that it could be used as a protection against other diseases, and he experimented successfully in safeguarding sheep from anthrax. Side by side with these experiments went his researches on rabies, begun in 1880.

He found an inoculation which would not only prevent this horrible disease, but also *cure it*, if applied to animals after they had been bitten by a mad dog. Then one day a woman brought him her little boy who had been terribly bitten, and after consulting a famous doctor

Louis Pasteur.



[Pierre Petit, Paris

Louis Pasteur.

who said there was no other hope of cure, Pasteur, in fear and hope, tried his discovery for the first time on a human being.

You must remember Pasteur was not a doctor. He had had no training whatever in medicine and had never tried any of his theories on people. He might have been killing the boy; it was a horrible time of suspense for him. The child completely recovered. Shortly afterwards a young shepherd, who had been bitten in rescuing some children from a mad dog, was also treated and saved. In the next six months 350 people were successfully cured. Pasteur's fame rang through the world. People came to him from all countries, including nineteen Russians who had been torn and mutilated by a mad wolf. Though the wounds were fifteen days old, only three of them died.

Subscriptions were raised in France and abroad, and the Pasteur Institute was founded in Paris where the preventive treatment of hydrophobia might be taught and practised, and Science, in Pasteur's words, might "labour to enlarge the frontiers of life."

While Pasteur worked in France, Joseph Lister (1827-1912) was at work across the Channel. Lister's father had himself been an amateur scientist as well as a prosperous merchant, and he early taught the boy to love using a microscope and making delicate drawings. The family were Quakers, which at that time closed many schools and the two great universities to Joseph, but he had a very sound education at Quaker Schools and at University College, London. His first piece of original research work was done there on the muscular tissue of the iris of the eye. On this, and on the phenomena called "goose-skin," he wrote papers illustrated by his own drawings which attracted considerable attention and brought him the friendship of a very famous German professor.

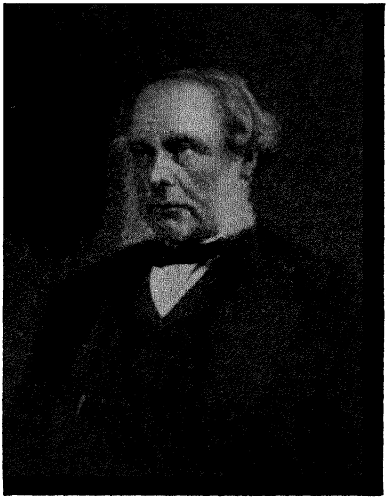
Lister then went to Edinburgh on a visit which shaped all the rest of his career. He not only became the friend and pupil of James Syme, the most skilful and daring surgeon of the day, but also married Agnes Syme, his chief's daughter.

On their honeymoon they made a tour of the German universities where Lister, though he had not yet made a name for himself, was well received on account of his obvious intelligence, his courteous manners and his fluent German.

Soon after his return he was elected assistant surgeon to the University of Edinburgh, and then had not only to operate without Syme, but also to operate before students and give lectures. At first there was no particular sign of a brilliant career before him. His lectures would have had a poor audience had not his dressers, from personal affection for him, made a point of attending to swell the class. But all the time he was experimenting and thinking for himself, concentrating on the problem of the wounds which would not heal.

He had all that absorption in his work which makes " the absent-minded professor " of the humorous stories, and his wife had a hard job to keep him reasonably punctual in his hospital rounds. Then, once she had got him to the hospital she could not get him out again, as he forgot everything in his interest in his patients !

The results of his concentration came after he had become head surgeon of the Royal Infirmary at Glasgow. Glasgow was one of the towns which grew very rapidly and without any attempt at planning during the Industrial Revolution. The streets were narrow, many of the houses were insanitary; the hospital lay in the very worst part of the town, on the edge of the old cathedral graveyard. Under its very windows the victims of a cholera epidemic had been given hasty pit burial reaching within a few inches of the surface. When Lister first took charge, patients were being brought from streets foul with dirt, smoke and disease into gloomy wards filled with this poisonous graveyard air. Yet conditions in Glasgow were no worse than in many other places seventy years ago. Doctors had come to accept them as commonplace; Lister set out to fight against them with all the knowledge of his researches and practical experience.



[*Mansell*

Lord Lister

He devoted two years to the work in which Florence Nightingale had led the way. Fresh sunlight, air, drainage and cleanliness were essential, he said, for hospital patients. Then he turned his attention to dressings. Pasteur's papers on the nature of germs were of enormous help to him, but he had to find something that would kill the germs in a wound without inflaming the wound itself, and he had to keep other germs from entering while the wound was healing.

Carbolic acid had been discovered in 1834 and tried by some surgeons with varying but never brilliant results. Lister, after countless experiments, found a form of carbolic which could be dissolved in oil and used to clean without irritating. But even having once cleaned, the old method of bandaging did not prevent other germs from entering. His next patient search was for a protective dressing and it ended in the making of cyanide gauze, a familiar object in every hospital and surgery to-day. Meanwhile the success of his operating methods, the use of carbolised silk and catgut and of special solutions of carbolic for the surgeon's hands and instruments, brought him European distinction. He had a large following among French and German surgeons, but England was strangely slow to recognise his greatness. When he moved to London in 1877 his discoveries were still sneered at there. It was not until after the International Medical Conference at Amsterdam two years later that his English colleagues began to revise their opinions when they saw the respect paid him by all the greatest foreign doctors of the day.

In the years which followed, he travelled in Canada and South Africa and received English, as well as German and French honours, becoming the first medical man to be raised to the peerage for his work. He died in 1912 and was buried in Westminster Abbey, having it was said, " saved more lives than all the wars of the ages have thrown away."

Two other great adventurers of science, working from the close of the last century into this, were Pierre Curie and his wife, Marie Sklodowska. Both were the children of scientific parents.

Pierre, second son of a Paris doctor, made an early study of mathematics and physics, took a degree in 1878, and at the age of nineteen was an assistant in the Science Department at the Sorbonne in Paris. His elder brother, Jacques, was also there in the Organic Chemistry

Department, and the two made constant experiments together, doing valuable research work in piezo-electricity (the production of electricity by the compression of crystals). Later, Pierre became Chief of the Laboratory at the School of Industrial Physics and Chemistry, but remained a pupil of Gabriel Lippmann, the Professor of Physics at the Sorbonne, who became famous for his colour photography.

Marie Sklodowska was the daughter of a Polish professor of science in Warsaw. As a very small girl she helped her father in his laboratory, washing and tidying his bottles and test tubes. Then as she grew a little older, she began to show a remarkable interest and understanding in his work, helped him to set up his apparatus and eagerly listened to his lectures.

Poland in those days was under the rule of Russia, a tyrannous rule that was rooting out Polish customs, and which forbade the use of the Polish language and the singing of national songs or dancing of national dances. Warsaw was a centre of seething patriotism, " everybody who was anybody was a revolutionist." And Marie Sklodowska grew up to be one too. Little is known exactly of what happened, but revolutionary meetings were held at which a number of her father's students were ringleaders and she herself " more than an onlooker." The police heard of the affair, and Marie left Poland to continue her study of science in Paris.

She began her life of exile in her early twenties, with nothing but her brains and courage between her and starvation. She managed to make a little money by private teaching, but for so long she had to live on bread and milk that she lost her taste for meat. Then she got a job at the Sorbonne, where she was to look after the furnace

Photo.] [Topical

Madame Curie.

and wash the bottles! Fortunately she was also able to show that she had real knowledge of the work going on in the laboratories, and at last attracted the attention of Gabriel Lippman, the Professor of Physics. On learning her history Lippmann put her under Pierre Curie, his most promising pupil, to study for her degree. In 1895 Pierre Curie and Marie Sklodowska were married.

Both were poor, and both loved their work. From the first they helped each other, not only in the laboratories but also at home, Pierre doing the housework while his wife cooked so that they might hasten back to their science. Within three years Marie took a brilliant degree in mathematics and physics, and began research work on a new ray, allied to the X-ray, which had been discovered by Röntgen in 1895 (the year of her marriage).

Pierre was at first experimenting in electricity, but he left this work and joined his wife in hers. Their effort was to isolate and study the material which gave out these rays which Röntgen had discovered. Four years of experiment brought them to radium, a substance which is a source of danger as well as of good to man, for Pierre's hands were crippled by his work.

With their discovery came a fame which they did all they could to avoid, refusing to see reporters or photographers and still living very simply.

In 1904 Pierre Curie became head of a department specially created for him at the Sorbonne, with his wife as chief of the laboratory under him, and for two years they worked on happily. One day in 1906 Pierre went to lunch with some friends, talked of his work and left them, full of hopes and plans. He never reached home. Crossing a crowded street he was knocked down by a dray and killed instantly.

For a time Madame Curie was stunned; then gradually the thought of her two little daughters, now dependent on her, made her take up her life again. She went back to the Sorbonne, and her work was such that shortly after the outbreak of the recent Great War the French Government opened a Radium Institute and not only placed her at its head but asked her to take " supreme control of all work in radiology " in all their military hospitals.

Yet radio-activity remains to-day much as fire was to prehistoric man; we know of it but we have not learned " how to liberate it at will." The attempt to control it is at present a forlorn hope, but in Mme. Curie's words, " It is the charm of physics that forlorn hopes are always coming off."

CHAPTER XIX

PUBLIC HEALTH AND HOUSING

DISRAELI began his second ministry in 1874. During Gladstone's term of office he had pleasantly whiled away part of his time by writing a book called *Lothair*, published in 1870; the more famous novels *Coningsby* and *Sybil* had been published in 1844 and 1845. Also, though he hated the " monster meetings " so loved by Gladstone, he had appeared in several Liberal strongholds and let drop enticing phrases about imperialism and the health of the people being of more importance than political reform—which helped to bring him into power. These were the lines his ministry followed, Health, and the Empire.

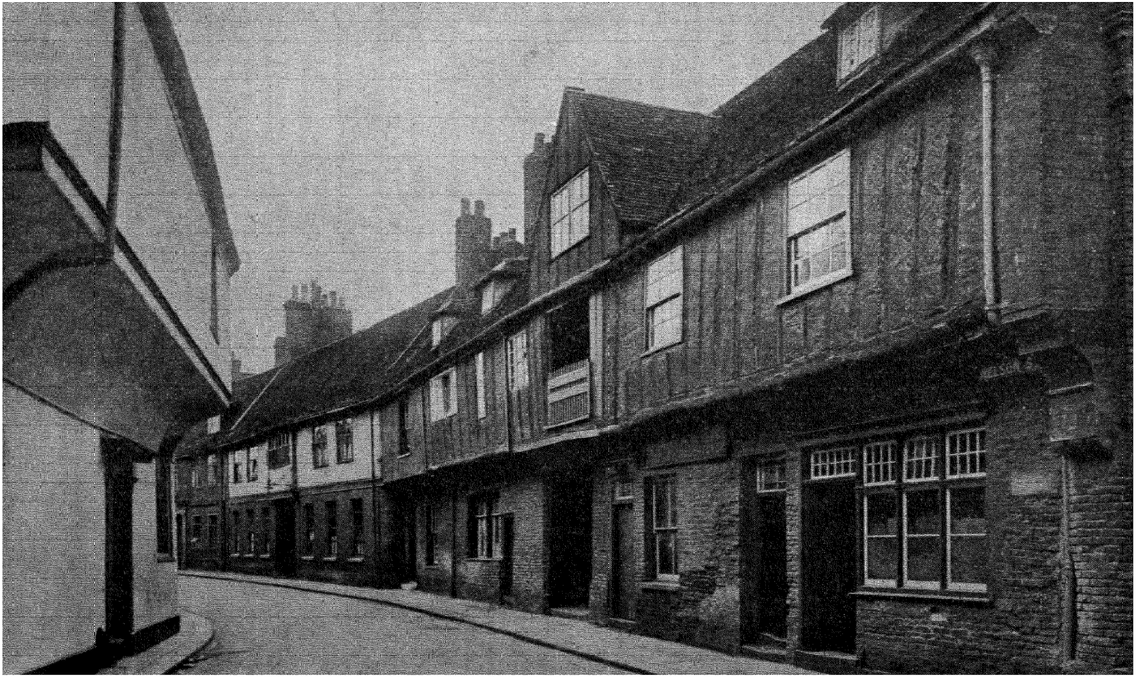
His first step was a Factory Act (1874) making nine hours the legal working day of all women and children in the textile industries. The Public Health Act came next in 1875. With the reform of the Town Councils, local Boards of Health had been appointed to deal with the insanitary conditions in the big factory towns, but they had not proved very effective. The Act of 1875 handed over the business of these boards to the municipal authorities with an excellent sanitary code, giving them the control of the water supply, drainage and parks or public spaces in their towns. They were also enabled to deal with " nuisances," such as the discharge of bad gases or of too much smoke from factories. Where they thought it necessary, they might build hospitals and mortuaries, and buy cemeteries out of the rates. Some towns used these powers with great energy and success; others moved more slowly and cautiously, but the worst horrors of the early industrial period, which had caused great epidemics of disease, gradually disappeared.

An Employers' and Workmen's Act was also passed in 1875 which completed the work of the Masters' and Servants' Act (1867) by putting the employer and employed on the same legal footing, making them equal parties to a civil bargain. Think of the enormous advance this was on the law in the days of Francis Place, who was afraid to go and look for work in case he was put in prison for having left his previous master at the time of a strike. In the same year the position of the Unions was again strengthened by an Act which gave workmen liberty to combine, even for the purpose of organising strikes, and allowed them to prevent "blackleg" labour during a strike by peaceful picketing. This meant that the strikers could put guards by the factory doors or dockgates to persuade non-union men from going in to work, while violence could be dealt with by the ordinary criminal code.

The following year Disraeli returned more directly to "Health" again. He had very real sympathy with the working-class, which he showed in his books as well as his political work, earning for himself many caricatures in *Punch* on his "Tory-Socialism." The question before him in 1876 was the renewal of "enclosures." The old enclosures, as we have seen, had chiefly affected the peasantry, a class which had now practically vanished from England. But for twenty years, commons had been enclosed to obtain building land and private grounds, and buildings too were edging more and more tightly round the public pleasure grounds of the cities, the " lungs " of the crowded industrial areas. Disraeli passed an Act against the enclosure of commons (1876), and by another Act two years later saved Epping Forest as a playground for East Londoners.

Then he made the first Parliamentary attack on the vast question of Housing. Though reform in local government and the Public Health Act had done much to make the great industrial areas cleaner and healthier, yet the condition of many of the houses in the very poor districts was extremely bad. Damp and dirt and vermin, rotting wood and peeling plaster, broken windows and unsafe stairs were common in the houses in the very poor districts. The Artisans' Dwelling Act (1879) gave the Local Authorities, in towns of over 25,000 people, power to buy and pull down these houses and build new, properly drained ones on their sites. Thus, at least, a " beginning " was able to be made towards improving the worst of our overcrowded slum areas. The difficulties of the Local Authorities have been increased by the fact that many families in their areas have made little effort to keep their homes clean and tidy, while some have ill-treated, and actually damaged, their houses, in this way helping to make them unfit for human beings to live in.

While Disraeli and his lieutenants were improving the lot of the worker on land, warm-hearted, hot-tempered Samuel Plimsoll was fighting to get conditions improved at sea. During the change from sail to steam many unseaworthy old hulks had been bought up cheaply, patched a little and given a coat of paint to make them outwardly presentable, heavily insured, and sent out by unscrupulous owners who did not care whether they sank or not. Indeed they often hoped they would, as the insurance



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Some historic houses in Nelson Street, Kings Lynn.

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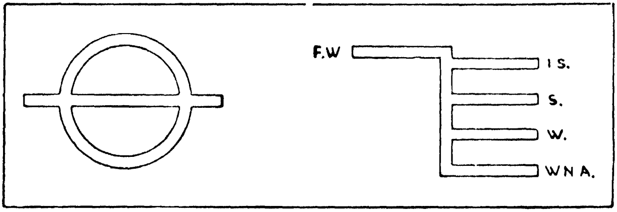
Samuel Plimsoll.

A Pioneer of better treatment of Merchant Seamen. He is commemorated by the Plimsoll mark—a load-line which indicates the depth to which a ship may be safely loaded.

money was worth more than the crazy ship and its cargo put together. Another very common practice was overloading. The sailors had very poor quarters in which to feed or sleep. Officers were induced to sail in these "coffin-ships" by the promises of big bonuses and premiums; the unfortunate seamen were forced by necessity to accept employment where they could get it.

Samuel Plimsoll collected his facts from the great ports and put them before the House of Commons with fierce indignation. He called the ship-owners, as a body, names which cannot appear in print; he more than once lost his temper completely at the indifference of the members, but at last he touched them by his passionate earnestness and won his point. The Merchant Shipping Act was passed in 1876, providing that a "load-line," since known as the "Plimsoll line," should be marked on every ship. This line had to show above the water when the ship was ready to leave port or it was known that she was carrying a load too heavy for safety. The Board of Trade was to inspect all merchant ships and detain those which were overloaded or unseaworthy, and deck-loads were forbidden in the winter months.

The Imperial side of Disraeli's programme began with the Indian Tour of the Prince of Wales in 1875. This was the first time that royalty had visited the Colonies, and it proved a great success, the Prince being greeted with such enthusiasm that on his return Disraeli advised the Queen to take the title of Empress of India. He himself was created Earl of Beaconsfield the same year. On January 1st, 1877, Victoria was proclaimed Empress at a magnificent " durbar " or festival at Delhi, and India, which loved pomp and titles, was well pleased.



The load line and Plimsoll mark.
F.W. *Fresh Water.* I.S. *Indian Summer.* S. *Summer.*
W. *Winter.* W.N.A. *Winter North Atlantic.*

Disraeli's next move was less spectacular but certainly no less important. In 1875 he bought the Khedive of Egypt's shares in the Suez Canal, ensuring England's trade route to the East. Much of the £4,000,000 required was supplied by the millionaire Lord Rothschild; it proved a sound investment, for by 1900 the shares were worth more than £26,000,000,. But, though he encouraged the colonies in trade and progress as much as he could, wars on the Continent forced Disraeli to concentrate more and more on his foreign policy in Europe, and the coming of peace did not bring peace to the House of Commons. For Ireland once more was in turmoil.

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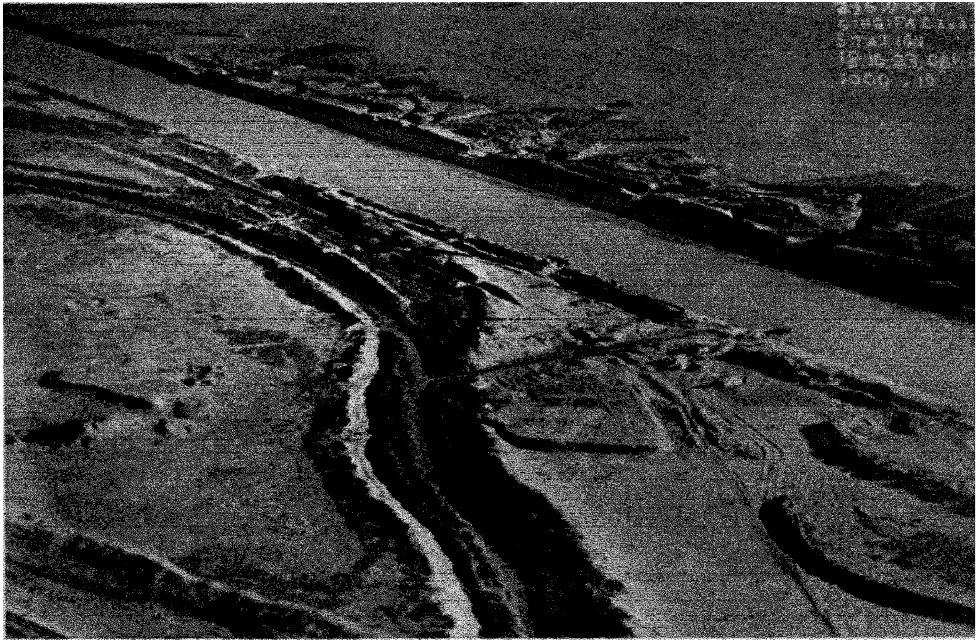
"Young Mr. Parnell," a small Wicklow landowner with American rebel blood in him and a Fenian mother and sister, led the movement for Irish Home Rule. His method of drawing attention to the Home Rule Party was the organised obstruction of debates. He was cold and calculating, and while his "Land League" kept Ireland under a reign of terror, he led his party at Westminster to wear down Disraeli, now an old man of over seventy, by weeks of futile discussion and continuous nerve-racking all-night sittings over the smallest details of Parliamentary routine.

The old Minister put up a gallant fight until 1880, but the tide had turned against him. The support of his party had weakened, he had lost the trust of the country, mainly perhaps, as the result of his own long, changeful political history. In 1880 Gladstone was returned to power, and the following year Disraeli died, witty and a little cynical to the end.

As a boy, without influence or great fortune, Disraeli had determined to become Prime Minister, and Prime Minister he twice had been.



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Air Ministry.

Air View of the Suez Canal.

B.H.VIII VI.

Facing page 238.

CHAPTER XX

TWO GREAT CANALS · AND A GREAT ENGINEER

de Lesseps

BETWEEN the years 1859 and 1914 the journey round the world by sea was shortened by several thousands of miles through the cutting of two great canals. One, piercing the Isthmus of Suez, joined the Mediterranean and the Red Sea, the other through the Isthmus of Panama joined the Atlantic and the Pacific. The idea of a canal between the Red Sea and the Mediterranean was very old. Rameses II, King of Ancient Egypt actually dug a waterway from the delta of the Nile into the Red Sea, but it gradually fell out of use and was allowed to fill up. Darius I of Persia re-opened it, and down it passed the boats of the Arab conquerors of Egypt before it again fell into disrepair.

Over two thousand years later Napoleon, during his Egyptian campaign, sent an engineer to report on the possibility of building a modern canal, but the report was unfavourable and the work not undertaken. It continued, however, to be discussed just as a shipway through the narrow central strip of America had been discussed ever since the days of Columbus and Cortes. Both of them, and many of their successors, were convinced that a natural channel must exist, and spent much time searching for it, but as we know no passage was ever found any nearer the Equator than the Straits of Magellan (1520).

The man who brought discussion of theories to an end by making one of the canals a fact was Ferdinand de Lesseps, born at Versailles in 1805. His father was a diplomatist, and on leaving college he, too, entered the Diplomatic Service, and became Attaché to the French Consulate in Lisbon. Later, he spent seven years in Egypt, where he was for a time Consul at Cairo, and twice deputised for the Consul-General at Alexandria. These years were of great importance to him later, for he learnt to understand the Egyptian people, and more, gained the friendship of the Egyptian rulers, Mehemet Ali and his son. The latter, wrote de Lesseps "was an enormously fat child. I taught him to ride and made him take exercise, much to the delight of his father." The fat boy's riding lessons proved later to be the origin of the Suez Canal.

From Egypt de Lesseps went to Holland, and from Holland to Spain, where he was so successful an ambassador that, when he left, the Queen herself said in a public address, "You carry away with you my esteem, and that of all my subjects." In his next diplomatic mission, however, he completely failed—from the point of view of the French President, Prince Louis Napoleon. The Prince sent him to Rome at a time when there were serious difficulties between France and Italy. De Lesseps' official task was to promote goodwill between them, but the Prince, who secretly meant to restore the French Empire, with himself at its head, really wanted his envoy to gain the support of the Pope for this design. De Lesseps was an honest man. He worked for a diplomatic settlement between the countries without any regard for the Prince's schemes. The result was that the Prince recalled him in circumstances which caused him to resign and entirely abandon any further idea of a

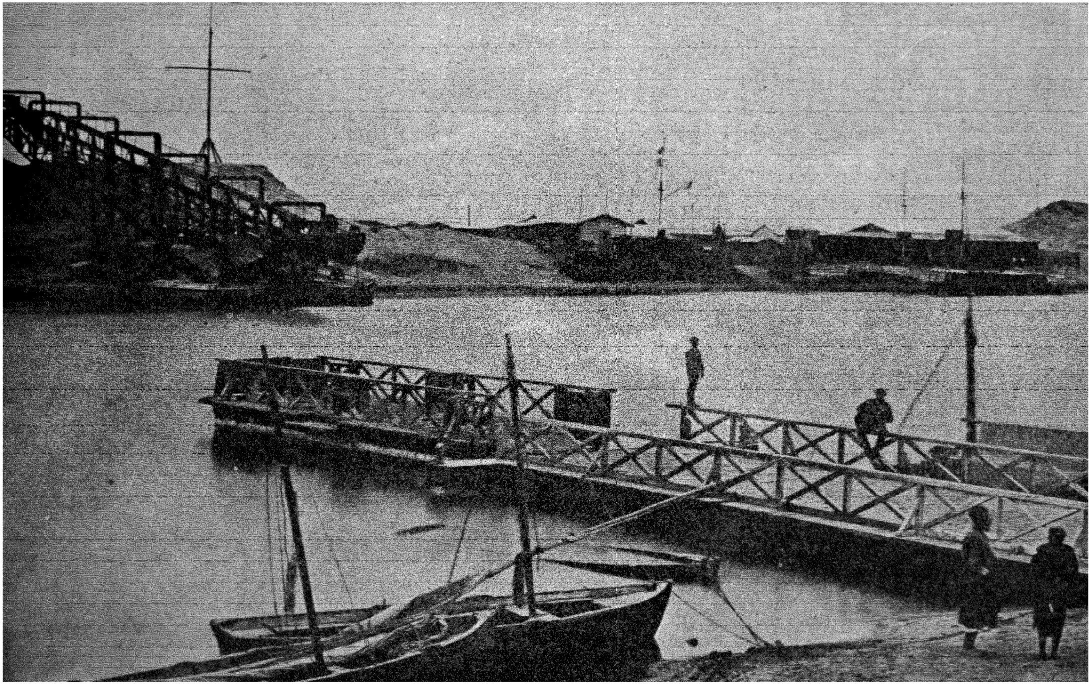


Photo.] [Mansell

A view of the Suez Canal at Kantara.

diplomatic career. He retired, and became land-agent to his mother-in-law, studying as a hobby the possibilities of the Suez Canal.

It was then that he heard his fat little friend of the riding lessons had become the Khedive of Egypt. De Lesseps wrote congratulating him; Said Pasha replied inviting de Lesseps to visit him at once. He had determined that the Suez Canal should be cut, and suddenly saw in de Lesseps the man to serve him.

In November, 1854, de Lesseps, with three French engineers set out to explore the Isthmus. It was then an empty desert, so that the four of them needed sixty camels, twenty-five loaded with water, the rest with provisions, tents and surveying instruments. The same land to-day has forty thousand inhabitants!

De Lesseps spent five years in making his survey. He had long before decided that nothing could be done with the ancient waterway of Rameses. No canal deep enough for modern shipping could be led out of the waters of the Nile. He traced an entirely new route from sea to sea before appealing for capital with which to dig his canal. Throughout these five years the Powers of Europe had been wrangling over the proposed canal. Some saw in it a danger, some thought it would be bad for their trade, many said it could never be made to pay, others held exactly the opposite views. De Lesseps moved mountains to raise the necessary capital, and in the end his greatest opponent, Lord Palmerston, proved an unwilling asset. For the mere joy of opposing England, French investors rallied round him. In his memoirs, de Lesseps tells the story of one aged man who came to his office.

"I wish," he said, "to subscribe for the railway of the Island of Sweden."

Count Ferdinand de Lesseps.

"But," it was explained to him, "it is not a railway, it is a canal; it is not an island, it is an isthmus; and it is not in Sweden, it is at Suez."

"That is all the same to me," he replied, "provided it be against the wishes of the English, I subscribe." He remembered Waterloo.

So the close of 1858 saw the Universal Company of the Maritime Suez Canal in full swing. Considerably over half the £8,000,000 capital had been raised in Europe, France contributing £4,400,000. The Khedive supplied the rest. In April, 1859, Ferdinand de Lesseps gave the first blow of the pickaxe and turned the first spadeful of earth on to the Mediterranean beach; the building of the Suez Canal was begun. At that point now stands Port Said, named after the Khedive, Said Pasha, who had been "an enormously fat little boy."

The work was colossal. Sixty dredging machines were used which carried off 2,763,000 cubic yards of rubble a month, and in addition to the canal itself, a water course had to be built bringing drinking water across the desert from the Nile. At last all difficulties were overcome and the grand day of opening was fixed for November 17th, 1869. Fifteen days before, an immense rock was discovered in mid-course three yards below the water which broke the claws of the dredgers. It would be impossible for a steamer to pass.

"We cannot move it in a fortnight," declared his assistants; "the opening must be postponed."

"Never," cried de Lesseps. "Go and get powder at Cairo, powder in masses—and then, if we cannot blow up the rock, we will blow up ourselves."

He probably meant it! The rock, however, was blown up, and on the 17th the opening ceremony took place.

The Canal was an immediate success. Four hundred and eighty-six vessels passed through it in 1870, and by 1900 the average had risen to 3500, over 57 per cent. of which were British. For in spite of her early opposition Britain gained more than any other country in Europe through the canal, not only because it added enormously to her trade with the East and to the trade of her Indian Empire, but also because it brought her into much closer communication with many other of her colonial possessions.

Britain was not slow to recognise her mistake. She joined France in offering honours to de Lesseps, and gave him a magnificent reception, almost surfeiting him with banquets and displays when he visited London in 1870, while in 1875, guided by the genius of Disraeli, the British Government bought the Khedive's shares in the Canal for four million pounds. Within a quarter of a century they were worth twenty-six and a half millions.

De Lesseps, naturally, had made a huge fortune and had at his disposal powers such as few Governments, still less individual men, have possessed. Having cut the Old World in two by one canal he decided to halve the New World by another, and in 1881 formed a company to attack the Isthmus of Panama. But here he met a grim adversary—Death !

The first Director-General of the new canal spent thirty thousand pounds in building a house on top of a hill for his wife and children; but before the house was finished the wife and children had died of yellow fever. Grief-stricken, the director went back to France. Another man came to take his place, and the fever claimed him too. A thousand workmen were sent to dig, and within a year every one of them was dead. Another thousand followed and another thousand. Only the yellow fever lived on in

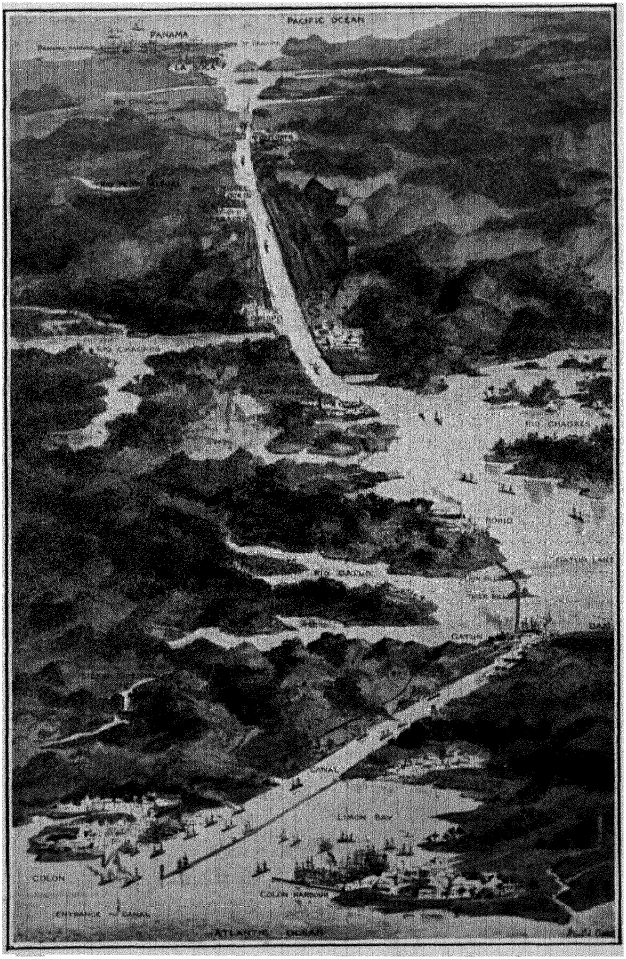
Panama. Clothes and baggage were disinfected or burnt, ships turned away from the docks, thousands of tons of cargo thrown overboard in the belief that they contained the germs of death, thousands of pounds worth of building material destroyed in the hope that the invisible enemy would be destroyed with them. But for all these desperate efforts the yellow fever raged on.

The doctors were fighting in the dark against an unknown foe. Their efforts are one of the most pathetic records in history, for in their ignorance they did the very thing which brought the plague among them. They stood their patients' beds in troughs of water—and it is in water that the mosquitoes which carry yellow fever breed.

The courage of these French doctors and engineers and the great army of workmen equals any heroism of siege and war, for in the face of this death which mowed them down more terribly, more silently, than anything in the legends of gods or witches, they worked on. Mile after mile they drove their way into the very stronghold of death. Their course lay straight through the mosquito swamps, the smallest bite of a mosquito often meant yellow fever, *and nobody knew.*

They failed ! They were foredoomed to fail. With nearly fifty thousand men and over fifty million pounds the great de Lesseps was beaten by the unknown death. He died himself in Paris, heart-broken, and his name lay written across Panama in heaps of earth and twisted iron, broken, rotting machines, and small, silent crosses.

Yet, in a sense, it was a Frenchman who built the Panama Canal, the little round-bearded scientist, Louis Pasteur. For men, following up his work on germs, learnt how that terrible death was spread. An Englishman, Sir Ronald Ross, and an American, Dr. Walter



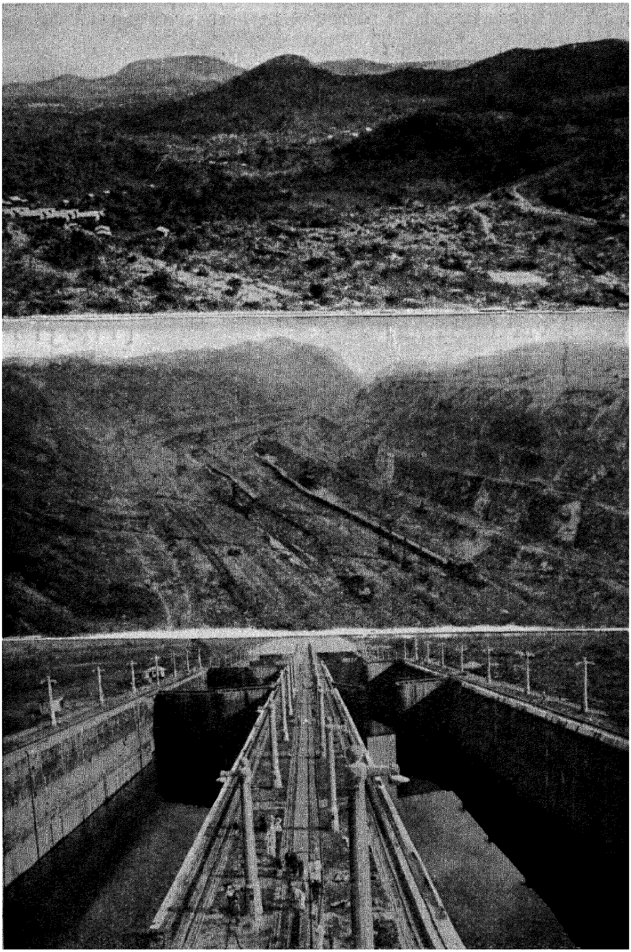
A bird's-eye view of the Panama Canal.

Read, tracked down through the microscope the germs of malaria and yellow fever, and learnt the habits of the mosquitoes who carried them. Two of the greatest heroes of the canal are the unnamed American privates who volunteered to allow themselves to be bitten by these poisonous mosquitoes to help the doctors in their experiments and study of the disease.

So when in 1904 the United States decided to finish the canal, it was a doctor they sent as head of that workshop five miles wide and forty-five miles long. His name was Gorgas, and he had begun life in his own words, as " a ragged, barefooted little rebel, with empty pockets and a still more empty stomach." He rose to become a Colonel by Act of Parliament (for he had never been in the army, but in American hands the canal was a military project) and became supreme master of forty thousand men.

He had all buildings raised from the ground and covered with fine wire screens; he ordered every household to cover all vessels that held water and expelled all alcohol from the canal zone. He drained lakes and swamps, pouring the filth of ages into the sea; he drained every pool and ditch or sealed them with oil so that the mosquito larva died; and he cut down jungles of grass and burned all rubbish. When the ditching, draining and oiling was done and the stronghold of death destroyed, he moved in his giant machines, excavators, dredges, locomotives, pumps and cranes, and dosed every man who worked there daily with quinine. So the path was cut through a mountain from sea to sea—and the death-rate in Panama became one of the lowest in the world.

This canal, finished in 1914, had also its great effect on world trade, but unlike the Suez Canal it benefited



The Panama Canal.

1. *The malaria-infested country before the canal was cut.*
2. *The excavation of the canal bed.*
3. *The Gatun Locks on the canal to-day.*

the United States far more than it did Britain, as the following table shows :

New York via Panama	to Yokohama	9,835 miles.
Liverpool via Suez		11,640 miles.
New York via Panama	to Sydney, Australia	9,854 miles.
Liverpool via Suez		12,234 miles.
New York via Panama	to New Zealand	9,872 miles.
Liverpool via Panama		11,631 miles.

It will be seen that New York was now 1805 miles nearer to Japan, 2382 miles nearer to Australia, and 1759 nearer to New Zealand than was Liverpool, and with the rapid development of American industries, the United States has become a serious rival in these markets which she can reach so much more quickly than Britain.

§

Yet Britain, too, gained, as we shall see in the next chapter, through the added prosperity of the Over-Seas Dominions.

CHAPTER XXI

OUR WORLD-WIDE EMPIRE AND TRADE

§ I. CANADA

THE last years of the nineteenth century saw Britain with Daughter Lands and Colonies in every part of the globe, and with an unquestioned supremacy of the Seven Seas. Her Dominions and Colonies were rich and for the most part self-governing, her Navy the police-force of the Ocean, and her Merchant Service the world's carriers.

Canada had become a wealthy trading nation. The Canadian Act of Union (1840)—following Lord Durham's Report—was a great landmark in Imperial History: it was the beginning of the idea that all countries within the Empire should be allowed to rule themselves as soon as they were fit to do so. The stability of the British Empire is very largely due to the operation of that idea; it is an empire bound together by goodwill, a far surer tie than force.

As the years went by, it became obvious that Canada could never be a great nation unless the colonies east and west were united; and union was impossible without conquering the vast prairies. The man who saw this more clearly than any other was Sir John Macdonald, the Conservative leader in the Union Parliament.

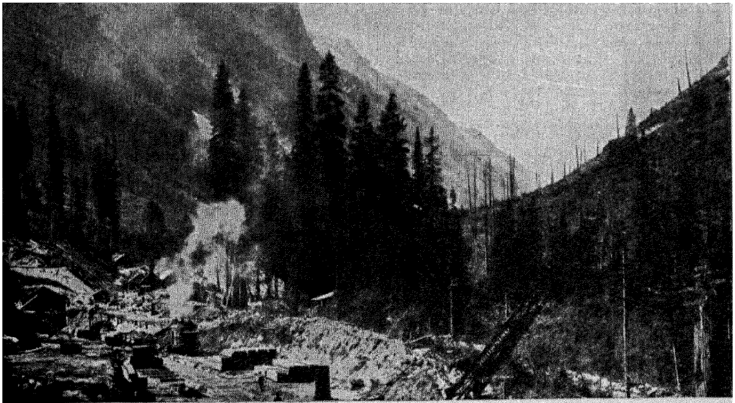
Macdonald, both in face and character, was extraordinarily like the more famous Conservative leader

Benjamin Disraeli, twice Prime Minister of England. His power of oratory and of managing men succeeded in swaying the colonies towards the British North America Act, by which, when the final draft was passed in 1867, the Colonies were combined to form the "Dominion of Canada." Under this Act each province kept its own Assembly and Lieutenant-Governor, but over them all was the Central Federal Government with which alone the British Government dealt.

But British Columbia had only joined the Federation on condition that a railway should be built across the trackless prairies linking her with the Atlantic provinces. Macdonald now threw all his energy into getting this railway from east to west constructed. He met with much opposition.

But all had a common fear of the rapidly growing Power to the south. For years there had been strain between the northern colonies and the United States. Feeling ran high during the American Civil War (1861-1865); trade disputes grew bitter and a general feeling of insecurity at last impressed the newly-created Dominion with the need for complete union and harmony among its provinces. Sir John Macdonald carried his point and the Canadian Pacific Railway was begun.

The difficulties which had now to be faced were far greater than the opposition of man; they were the silent, majestic opposition of Nature. The actual construction of the prairie section of the line was comparatively simple, but no towns stood there whose commerce could be linked up to defray the expense. These vast unpopulated stretches called for more economical methods than the English engineers, building between the busy English towns, had been used to practising.



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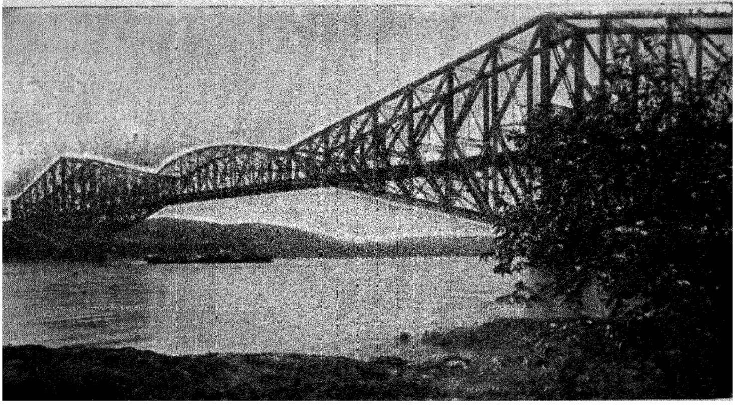


[C.N.R.

1. Cutting through a mountain during the making of a five-mile tunnel under Mt. Macdonald, in Canada.

2. The Quebec Bridge over the Gulf of St. Lawrence.

Other railways had already been built in the eastern provinces; on the Grand Trunk Line, Robert Stephenson (son of George Stephenson) had spent six years' work and 6,300,000 dollars on a single bridge over the St. Lawrence. Even by Macdonald's magnificent gamble in mortgaging the credit of the country, such sums could not be raised for the Canadian Pacific; and contracts had been signed that the entire line should be completed within ten years.

Eight chief engineers were employed, two Jews, two Scotsmen, and four Englishmen. The St. Lawrence was spanned by a steel bridge, built in a year and costing less than 1,000,000 dollars. Then came the great waste belt of forest and rock and swamp to the north of Lake Superior, every mile of which had to be hewn or blasted or filled up before the prairies themselves were attacked, while in the west others bored and tunnelled and moderated the tremendous grades through the Rockies and the Selkirks. The energy with which the work was carried through and Macdonald's vigorous financial backing brought the line to a triumphant finish six years before the contracted time. On November 7th, 1885, those working from the east and the west met, Lord Strathcona drove home the last spike, and the steel highway making the Dominion really one country was an accomplished fact.

Before the line was finished came the birth of the great prairie provinces, Manitoba, Saskatchewan and Alberta. The repeal of the Corn Laws in England not only provided Canada with a growing market for wheat but also caused a slump in English farming so that men were willing to emigrate. In Winnipeg, "the gateway to the west," the population jumped suddenly from 300 to 3000. Then came a reaction. The newcomers found that English methods of farming were useless weapons against the long frozen Canadian winter. Transport was difficult and costly, and the loneliness of the vast spaces intolerable. Settling the prairie provinces practically came to a standstill.

Then with the dramatic finishing of the railway, Canada could at last be called one country, a strange, long, narrow country bound together by a steel band and hemmed in by the frozen north. And in the wake of the railway came the men of science. New types of wheat were discovered which needed less rain and ripened earlier than that in England, so that the harvest could be well over before the grim frosts closed in. The telephone linked farm to farm, destroying their old crushing isolation; more railways were built, and by 1900 American and European settlers were moving in again in a new " boom " which has never faltered.

Canada, however, owes her prosperity not only to wheat, but also to " mixed farming," cattle and horse breeding, fruit growing, coal, iron, zinc, asbestos and other minerals, timber, trapping, salt, fisheries, and manufactures, of which the chief are agricultural machinery, electrical appliances, paper and motor cars. The great Dominion is a world within itself, holding an amazing range of climate, scenery, and industries, yet fully justifying Macdonald's faith that it would become a closely united and powerful nation.

One province alone had stood out from the Federation in 1867. This was the great island of Newfoundland, the oldest of all Britain's colonies, claimed for Henry VII by John Cabot in 1497. Her chief industry was (and still is) fish, for which the United States provided her with a better market than Canada. She therefore preferred to remain outside the Dominion, free to follow her own trading policy, and in 1855 was granted a self-government, becoming a Dominion on her own. The island is rich in timber and minerals, well covered with good roads and railways, and important since 1858 as the terminus of the first great trans-Atlantic cable.

§ 2. THE WEST INDIES

Other islands further south along the Atlantic seaboard sprang into world importance early in the following century with the building of the Panama Canal. These were the West Indies. Not only was their own trade in sugar, cotton, tobacco and dyewoods greatly increased by the opening to them of nearer oriental markets via the canal, but also their ports gained new value as coaling stations and naval bases on a great world route. New industries have been developed, the chief of which are cocoa and bananas; roads, railways and electricity have expanded under the stimulus of growing wealth and population; the Bahamas, nearest Florida, have become one of the winter playgrounds of the United States, and a direct steamship service has been started with Halifax, linking the islands more closely to Canada.

§ 3. AUSTRALASIA

Passing through the canal and across the Pacific we come again to New Zealand, and the greatest of all islands, Australia. Both Dominions at the close of the nineteenth century were self-governing and of great commercial importance.

New Zealand, since the time of Sir George Grey's wise strong guidance, had prospered steadily. A high standard of education came into being, strict factory acts were enforced and Boards of Conciliation set up to deal with disputes between trade unions and employers. Farming and manufactures improved and increased; in and out of the fine harbours of Auckland and Wellington passed the shipping of the world.

Australia, too, had her great ports and industries, though the union of the states came late, and this delay hindered its growth. When railways began to be constructed on a large scale in the middle of the century, the country was still so cut up that each state used a different breadth of gauge and through-trains from state to state were impossible. It was not until 1900 that the Commonwealth of Australia came into being, though self-government had been granted fifty years before.

The wealth of Australia at the end of the nineteenth century came from the same chief source as the wealth of England at the beginning of the eighteenth; the sheep provided it. In North America the sheep-man is decidedly looked down upon—the cattlemen and horse breeders rather pity him—but in Australia and New Zealand he holds first place. Here the sheep industry means not only wool as in the old days in England, but also an immense export mutton trade, made possible by the invention of refrigerators, the freezing and cold storage of the meat. Beef is also dealt in by both countries, though not in such vast quantities.

Australia grew from a parched ragged wilderness into a prosperous merchant land very largely through the progressiveness of her own responsible governments. Victoria was the first state in the world to try trade boards and voting by ballot; and in every state the Government made itself responsible for communications, not only "the King's highways" but also railways, tramways and ferries. More, there were state parks and hospitals, state banks and information bureaux, and state experimental farms. For these farms pedigree stock was imported. Experiments were made in cold storage and in crops which would withstand drought.

But the army of the engineers went to war; great dams and locks began to appear across the Murray and Darling rivers; irrigation works spread the trapped water over the land; wells were sunk to tap the underground supplies and Australian farming prospered—and not only sheep farming. The great sheep runs cover the drier lands of the interior, but in the coastal lands mixed farming, cattle and grain and fruit, have each a firm foothold.

In addition there is the great mineral wealth of the country, gold and other precious metals, and in Victoria and New South Wales coal and iron. The working of these soon led to the establishment of Australian manufactures. The country produced the largest quantity of wool of any in the world, and with her own coal and steel abundant, she began to spin and weave for herself instead of exporting all her wool raw. The climate is not very good for manufacturing woollens, nor is the East, Australia's nearest market, a very good customer for them, but with the help of Government subsidies she can weave enough for herself, and will soon be doing more, while her raw wool is still competed for by manufacturers in all parts of the world, English, American, German and Japanese.

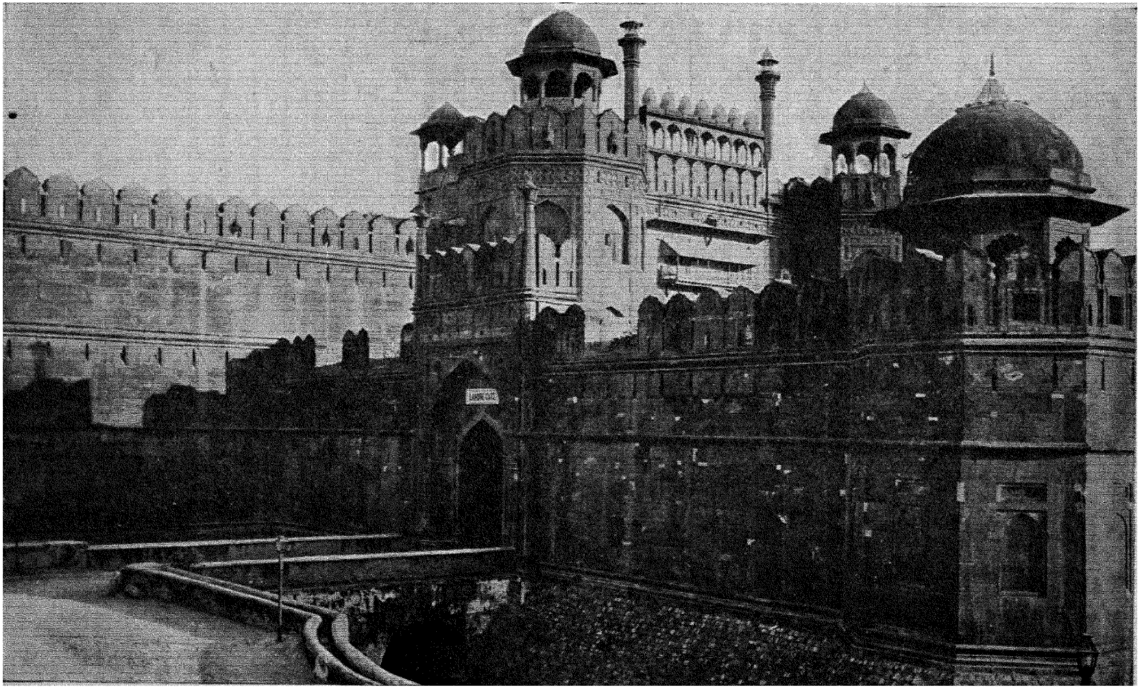


Photo.] [Frith

Delhi—the Palace. Lahore Gate.

§ 4. INDIA

India also had her industries, notably the cotton industry centring round the Bombay mills, which were, as we have seen, one of the outcomes of the American Civil War. But India had been through troubled times.

Baulked by the Crimean War from extending her power southward, Russia had steadily advanced throughout the latter half of the century to the south-east of the Ural Mountains until she reached Afghanistan. So Afghanistan became a buffer state between two great empires, that of Russia and that of Britain in India. There had been two Afghan wars, in the second of which Lord Roberts made his amazing sweep on Kandahar, virtually capturing the whole country. But Britain did not care to face the expense of holding Afghanistan and she evacuated it, making a " peace " that was only a name. Perpetual trouble and raiding went on on the border, while in India herself there were difficulties of another kind.

One of the problems was the rule of the native princes, whose dominions amount to about two-fifths of all India. Following the Mutiny, Lord Canning, son of the famous Foreign Secretary, reversed Dalhousie's policy and allowed them to adopt theirs, guaranteeing them the possession of their territories on condition that they helped the Government. British residents were appointed at each chief's court to keep a tactful oversight on the machinery of government, and, as a whole, the system has proved successful. Some of the princes are genuinely interested in reform; universities, railways, drainage and legislative courts have been built.

Yet the Indian peasantry has to work hard enough, even given the best conditions possible by their rulers, for three-quarters of them depend for their living on the land, of which their holdings work out at only a little over an acre per head. Coal and iron are being increasingly worked, however. Calcutta has its jute trade as well as Bombay its cotton, and something of an Industrial Revolution was beginning by the end of the nineteenth century. This the Government did all it could to foster, so that the great bulk of the people might cease to be entirely dependent on the land and at the mercy of the periodic famines caused by the failure of the monsoons (winds bringing rain).

Between the princes and the great labouring masses come the professional classes to whom Western education brought Western ideas of independence and the cry of " India for the Indians." But they were and are divided among themselves not only as to the method of achieving this but also by intricate differences of caste and religion. Meanwhile for all her problems India's roads and railways expand, factories spring up, towns and wealth grow.

§ 5. SOUTH AFRICA

Africa was another scene of great Imperial activity at the close of the last century, and in the early years of this. In South Africa the great personality was that of Cecil Rhodes (1853-1902) who added the wide territory of Rhodesia to Britain's domains. As a boy he joined his elder brother on a cotton farm in Natal, where even at eighteen he showed unusual power of understanding not only business details but also political movements. He was not an empire builder by accident; from very early days his dream was to unite as much of Africa as possible under the British flag. The discovery of diamonds at Kimberley brought him money—" the sinews of war." Like the discovery of gold in California and Australia, diamonds caused an inrush of mixed nationalities, Rhodes and his brother among them.

With the opening of the diamond fields and the discovery of gold in the Transvaal, Europe's interest had been fired by the Dark Continent, and there followed a " scramble for Africa." Portugal tried to extend her possessions, Germany seized a great territory around Zanzibar, Belgium claimed the Congo, Britain took over Bechuanaland. But to Rhodes the key to South African power lay in the possession not only of Bechuanaland but also of Matabeleland, the country now called Rhodesia. So in 1888, armed with the great wealth he had made through Kimberley, he obtained a Royal Charter for the formation of the British South Africa Company to develop that country, and, as he hoped, bring it into the Empire.

His first negotiations were with Lobengula, the Matabele chief, a man whom even in a " grotesque costume of four yards of blue calico over his shoulders and a string of tigers' tails round his waist " looked, and was, every inch a ruler. He was friendly to the British, and in return for arms for his warriors, money, and an armoured steam launch, he signed a Treaty giving them all rights over the minerals of his land. In 1890 a column of nearly a thousand men under the Chartered Company marched four hundred miles through trackless country and set up the British flag where the town of Salisbury now stands. Railways and telegraph wires sprang up in their wake in spite of many difficulties, and some fighting with the Matabele " impis," or bands of warriors,

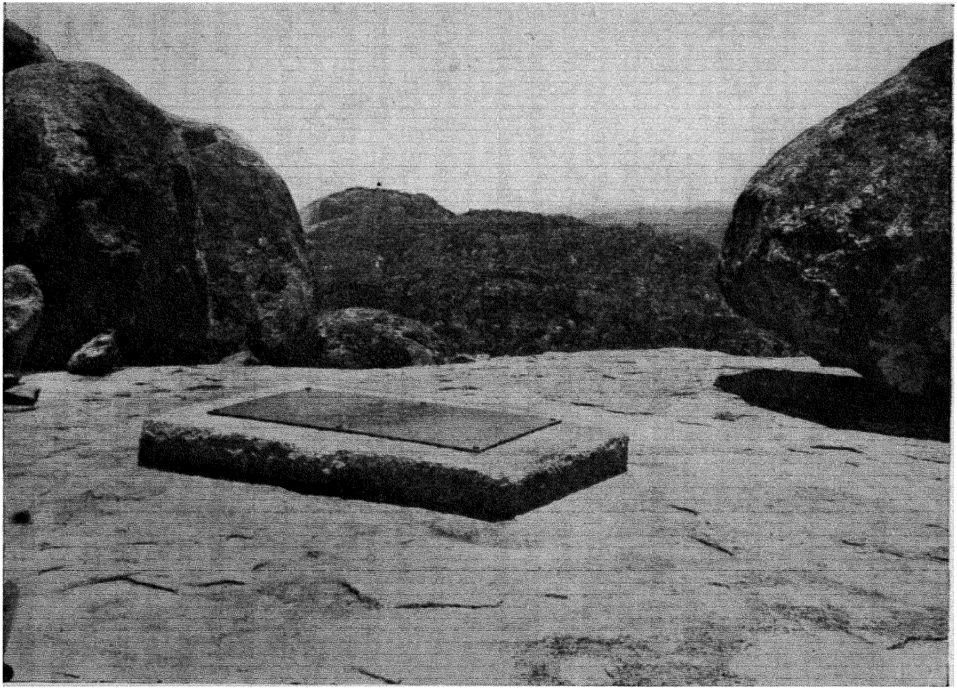


Photo.] [*Topical*

The ***grave*** *of Cecil* ***Rhodes, at Matopos,*** *Rhodesia.*

whom Lobengula could not control though he remained friendly himself. But at last, in 1894, the Chartered Company took over the whole of Matabeleland, the land where thirty years before David Livingstone, the famous missionary explorer, had preached and shot lions. So Rhodes's dream became a reality, and the country was re-named Rhodesia after him.

He was by then Prime Minister of Cape Colony and had gained the respect of both the English and the Dutch by always trying to live up to his motto of " Equal rights for every civilised man south of the Zambesi."

Though Rhodes did much fine work for the Empire in gaining peace and the loyalty of the native chiefs in Bechuanaland and Rhodesia, he could do nothing to avert the second Boer War, of which the Jameson Raid was a prominent cause. This was a far more serious affair than the first Boer War of 1881, and it lasted for three years (1899-1902).

The two Dutch Republics were annexed to the Empire, but four years later, the Boers were given self-government on the same basis as the Australian states, and in 1909 they joined Cape Colony and Natal, forming the Union of South Africa. Unfortunately, Rhodes did not live to see this, or the building of the Cape to Cairo Railway, another of his great projects.

Meanwhile, Britain, the small mother of these vast domains, had been making new friends in Europe. As in the old days in India and Canada, her interests had at first clashed in Africa with those of France. Both countries were now drawn together as a result of the domineering and militant acts of the German Empire. France was afraid of further attacks from the German army, while England was very disturbed by German ambition to be a great naval power. This challenge to her sea-power and thus to the safety of her trade and empire led England to welcome friendship with France.

They began to come to an understanding, and as various incidents arose where the exact territories under their power were in dispute, they agreed to settle the difficulties by the peaceful method of conventions, or conferences, instead of their ancient method of war. Through these conventions points of difference were settled, e.g., about North and West Africa, Madagascar, Siam, and Newfoundland where a dispute about fishing rights had been going on for two hundred years. In 1907 they formed the Entente Cordiale. This was a triple friendship, for France had already made a treaty of friendship with Russia.

So it came about that in 1914 Britain, her old hereditary enemy France, and Russia, enemy of the Crimean War and Afghanistan days, entered the field as Allies when Germany made her bid for the supremacy of Europe.

PART VI

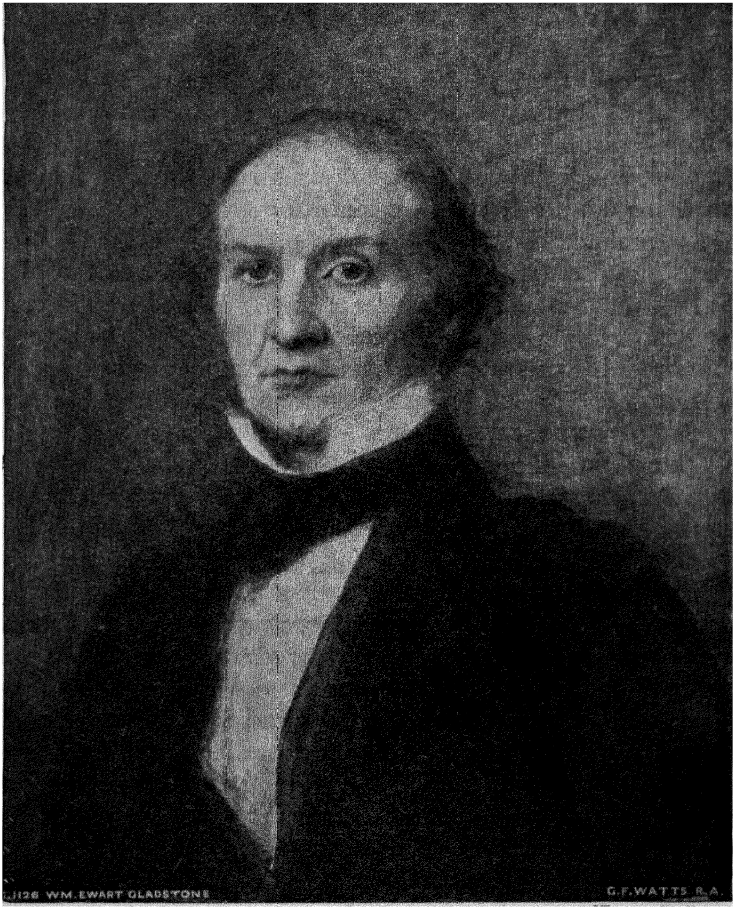
CHAPTER XXII

FROM GLADSTONE ONWARDS

GLADSTONE came into power for the second time in 1880 on the top of a wave of Scottish fervour. His campaign for the Midlothian constituency of Edinburgh had been a series of triumphal processions and cheering crowds. He delivered impassioned speeches on railway stations when his train paused, in market places, at cross-roads, anywhere where there was a sizable gathering of people to fan his oratory with their applause.

Four years after the labourer got his vote (1884), County Councils were established (1888), giving powers of local self-government to the country districts just as the Municipal Reform Act (1835) had given them to the towns over fifty years before. These County Councils are responsible for providing schools, for making and repairing roads, for looking after the very poor, and for many other local duties. But the country had not by any means caught up with the towns. There was no state regulation of working hours for agricultural labourers, no unions fighting for a better level of wages, and no big well-organised benefit clubs giving relief in times of unemployment. Before the country had come in sight of these another step took place in the towns.

So far the big and powerful trade unions had been those belonging to skilled workers, such as engineers,



G. F. Watts, R.A.] [*Emery Walker*

William Ewart Gladstone.

or carpenters and joiners. The unskilled labourer had not as yet any strong unions. He had been too poor to pay subscriptions big enough to build up large trade union funds to be of use during a strike; he had received no assistance from the skilled worker; he had, in fact, been discouraged as much by the craftsman as by the employer. Things were now to change. Some leading members of the big skilled unions were discontented with the position of the poorer, unorganised labourers, and began to agitate for better conditions for them.

The chance for this "New Unionism" came in 1888, when the London match factory girls went on strike. They could not have won by themselves, but supported by other unions, they succeeded. The next year, encouraged by this example, the great unorganised mass of London "casual" dock labourers went on strike for wages of sixpence an hour. So strong was the spirit of the New Unionism that the powerful Stevedores' Unions also struck out of sympathy and held up the trade of the Port of London for ten weeks until the dockers gained their point.

The success of the dock labourers was due to the sympathy and practical help they received from all classes. These unskilled workers discovered that strikes could succeed even without large funds to give strike pay, if the people of the country sympathised with their actions, as they did very strongly in this instance.

Another Act chiefly affecting the towns was the Shop Hours Act (1886) which limited the service of all shop workers under eighteen to seventy-four hours a week. It set no limit, however, on the hours of the men or women concerned. This is a point of interest because in nearly all previous legislation some provision had been made for women in Acts affecting children and "young persons," but the campaigners for woman's rights had demanded equality between men and women, and in this Act they got it. The women were left, like the men, to look after themselves, the state only interfering on behalf of the children and growing boys and girls.

The Workmen's Compensation Act was passed in 1897. The question of employers' liabilities for accidents during working hours had long been under discussion. Both the great political parties came to accept the doctrine that employers were responsible for injuries to their workers while at work, and that compensation should be made.

They could not, however, be held responsible for those of their employees who chose to ride the newly-invented "safety" bicycle in their leisure hours! The bicycle began life as the "dandy horse," a slim wooden horse on iron wheels, without pedals, of no real use except in coasting down hills. This gave way to the "penny-farthing," with its huge wheel in front and tiny wheel behind, the pedals being fixed to the centre of the front wheel. In the early nineties, however, the wheels became of equal size and had pneumatic tyres and a chain, and in this familiar form the bicycle became very popular indeed, opening a new world beyond the suburbs to the city workers.

It was in this period of national prosperity and of growing security and happiness for the worker that Gladstone, who had done much to advance both, died in 1898. Five years later the Employment of Children Act was passed forbidding children to be worked in a trade likely to endanger their health. Also they might not work at night or at street-trading until they were eleven years old, while there followed in 1907 the School

Medical Service Bill, providing for school nurses, doctors and dentists.

A year later another famous Liberal, David Lloyd George, passed two Acts for the benefit of the grown-up workers. One was the Old Age Pensions Act (1908), giving a weekly state allowance to persons over seventy who had not enough to support themselves, and the other the *National Insurance Act* (1908). Under this Act both the employer and the worker contribute a small weekly sum to a central fund, in return for which the worker, when ill, can be attended by a doctor free of further charge and may receive a weekly sum during a period of sickness.

So throughout the nineteenth century we have seen the idea steadily growing that the Government should look after the welfare of the nation's workers, caring for the conditions under which they worked and lived, educating them and giving them a voice in Government affairs. It must not be forgotten in looking back over the darker days of the early industrial period that this idea had not then been born. Like that other great idea, the abolition of slavery, it was new to the world in the nineteenth century, before which a different and less humane standard was accepted, not through deliberate cruelty, but through ignorance.

CHAPTER XXIII

THE NINETEENTH CENTURY FROM THREE ANGLES

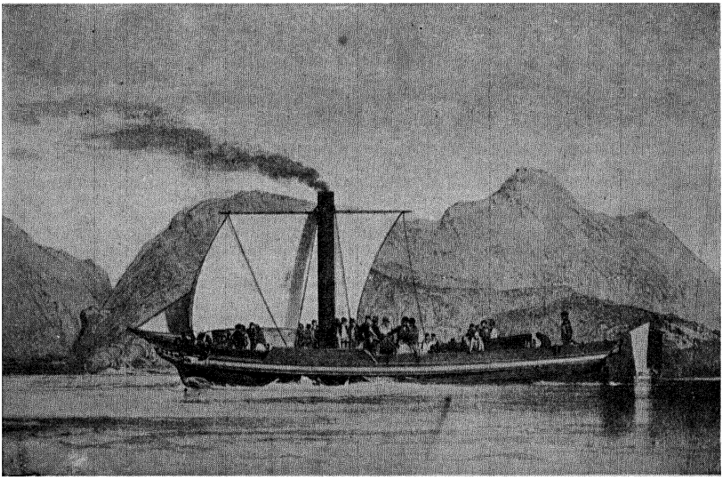
(1) The Rothschilds, Banking, Giant Businesses

§ 1

" IT requires a great deal of boldness and a great deal of caution to make a great fortune, but when you have got it you require ten times as much wit to keep it."

So said Nathan Meyer Rothschild, the second of the three men who amassed the great wealth of the family. All three possessed boldness, caution and wit. The first of the three was Meyer Anselm Rothschild, who began as a general merchant in an old fashioned shop in Frankfort, under the sign of " The Red Shield." He was clever and he was honest. All Frankfort, some grudgingly, some readily, had a word of praise for " the Jew at the Red Shield." He rose steadily, adding banking to his business and the Landgrave of Hesse to his friends. When in 1806 the invasion of Napoleon compelled this prince to fly from his domains he left all his money and treasure in Rothschild's care. The old banker used it in many schemes, making large profits for himself before he honestly repaid the prince every penny with which he had been entrusted. In those troubled days it would have been easy for a rogue to keep it all for himself, and Rothschild's upright stewardship won universal respect for his name.

He grew steadily richer, and managed the money affairs of more than one European nation, arranging loans for them and inventing a method of sending money from one country to another more quickly and safely than any other banker. This was very important in the early nineteenth century, especially to Britain, who, under Pitt's foreign policy, paid great sums to princes and soldiers all over the continent in her struggle against Napoleon.



[*From B. Woodcroft's "A Sketch of the Origin and Progress of Steam Navigation,"* **1848**

An early steam pleasure-boat, the "Comet," with passengers on board.

Meyer Anselm Rothschild died in 1812, leaving five sons. His last advice to them was "Keep the law of Moses, remain united to the end and consult your mother before beginning any great business."

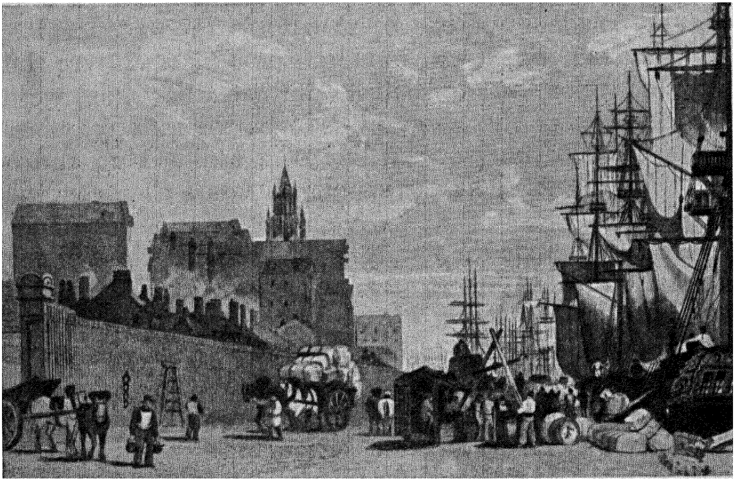
They followed it and prospered. The most successful was Nathan Meyer, who went to England as his father's agent in 1798, when he was a young man of twenty-one. He was trusted by the British Government and he trusted it, so that when Napoleon escaped from Elba and others were afraid to buy Government stock, he bought steadily, and as it proved, his trust was well placed. Then at the final crisis of Waterloo he was the first man in England to know of Wellington's victory, for he had sent a messenger with a carrier pigeon to the battlefield. It is said that he made hundreds of thousands in one morning on the Stock Exchange, buying at low prices before the news of victory was officially confirmed. For those were the days before the telegraph or even the railway, when news travelled only at the rate of a sailing ship and a galloping horse. The carrier pigeon was a characteristic inspiration.

No one outside the family knew the real extent of the colossal fortune this remarkable man made in his life. Eighteen times he arranged huge loans for various European Governments, and in 1822 the Emperor of Austria made him a Baron. He died in 1836.

His son, Baron Lionel Nathan, was that Rothschild who lent Disraeli the capital necessary to buy the Khedive's shares in the Suez Canal for England in 1875.

The other sons of old Meyer Anselm had founded businesses almost as vast in other countries, and by the end of the nineteenth century the name of Rothschild was the best known in the world, save only the names of sovereigns and of a few very great statesmen. They had money interests everywhere, and, following the wise advice of the founder of their family, had remained so closely united that they wielded great power. It was indeed scarcely possible for any affair of importance to take place in any part of the world without their being consulted.

The story of this family shows the ever-increasing importance of the *banking system*, a system which marked almost as big a step in the growth of trade as the change from barter to money. The bank has many functions. First of all it provides a safe place for men to keep their money, as old Meyer Anselm kept the prince's treasure safe. Then it provides the convenience of cheques. In the old days a merchant going to make a transaction had to carry with him big sums in coin, heavy to carry and tempting to highwaymen and brigands. The man whose money is safely deposited in a bank has only to sign a cheque for the amount of his purchase. This money can be paid from his bank into the bank of the man with whom he has traded, without either of them having to handle coin or notes.



[*From "Lancashire Illustrated," 1831*

A busy dock scene in the earlier nineteenth century. Note the beautiful sailing vessels with their tall masts.

The most important work, however, of the banks is to lend money to merchants, traders and manufacturers, and to enable them in this way to enlarge their businesses, to make or to buy and sell far more goods than they could do without this assistance. The banker knows that people who have deposited money with him cannot by any reasonable chance all want it out again at the same time. He therefore keeps in hand a safe amount and lends the rest, as Baron Lionel Nathan lent money for the Suez Canal shares.

Some banks are very old. The Bank of England, which was founded in 1694 by a Scotsman called Paterson, is not by any means the oldest, though it is one of the most important. But by far the greatest number of existing banks were founded in the nineteenth century, and made possible the immense growth of trade and manufacture. All over the world banks came into being. Canada and the United States, New Zealand, Australia and South Africa have risen to be rivals of the European trading countries with the help of their banking systems.

§ 2

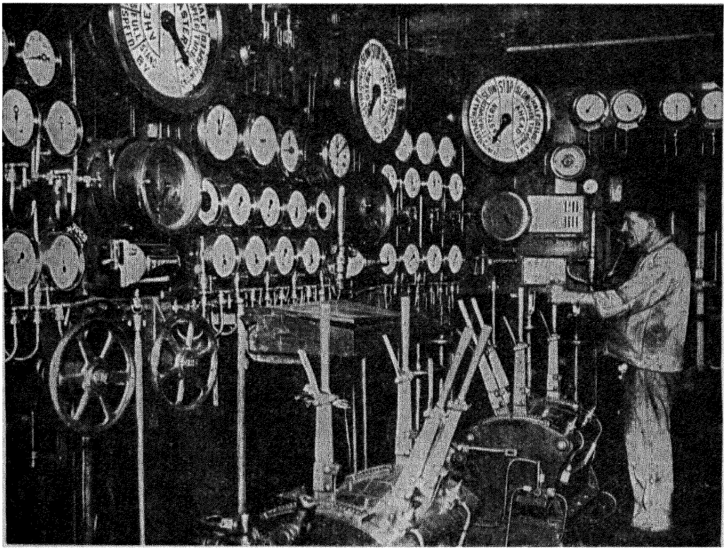
But the Rothschilds were not only bankers, even more they were financiers, that is, men who have a quick eye for profitable new enterprises and who bring together the capital which is required to start them. The growing industry and trade of the nineteenth century needed the help of such men very greatly. There were young men like Robert Owen with great ability and little wealth, who required help to build up their industries. There were railways to construct, mines to open and factories to build, all wanting more and more wealth to start them, to buy the materials and to pay the workers.

The finding of money for new ventures was immensely assisted by an Act which was passed in 1855 permitting "limited" companies to be formed. This meant that thousands of persons could each subscribe a share of the money required and become part owners of the railways, mines, ships or factories, and could do this without having to pay any more towards debts of a company if it did not succeed.

Limited Companies grew in number and in size very quickly indeed in the later years of the nineteenth century. There were many reasons why this should happen. The railways had removed the difficulty of getting coal and raw material in unlimited quantities. The great blast furnaces could be larger when iron and coal could be brought by rail and handled by machinery. Great heavy machinery needed larger and stronger factories in which to house it. Larger ships were cheaper to run than small ones. All of these things cost a great deal of money, and the new method of forming limited companies helped very greatly indeed to gather in the country's savings and to assist the enterprising men who were pushing forward our industries.

These are a few of the reasons which have led to the growth of larger and larger businesses. Here is an even more important one. At first, competition between businesses in the same industry was very fierce indeed. After a time, many firms in order to avoid ruin were compelled to make agreements with one another or even to combine together. Railways linked up with one another. Then shipping companies did the same, and later great businesses in the iron and steel industries were brought together to form huge *combines*. One of the earliest of these giant combines to be formed in England was John Browns' of Sheffield. They own iron ore deposits in Spain, coal mines in South Wales, and in England they possess blast furnaces for ore refining, mills for steel-making, and run shipyards which use the iron and steel for their mills.

In our own time these great businesses have grown up in the retail trade. We have huge departmental stores such as Harrod's, or Selfridge's, Barker's, or Lewis's, which are not one shop like a grocer's or baker's, but sometimes dozens of shops all forming separate parts of one great business where you may buy almost anything from pins and needles to motor cars, aeroplanes or houses.



Courtesy] [*Cunard*
Engine room starting platform on R.M.S. " Aquitania."

On the whole, the growth of these giant businesses is for our benefit. They can afford to spend larger sums on scientific studies for quicker and cheaper ways of manufacturing. They can buy their raw materials in huge quantities and therefore more cheaply. They can make good use of " waste " materials which in much smaller business would be thrown away.

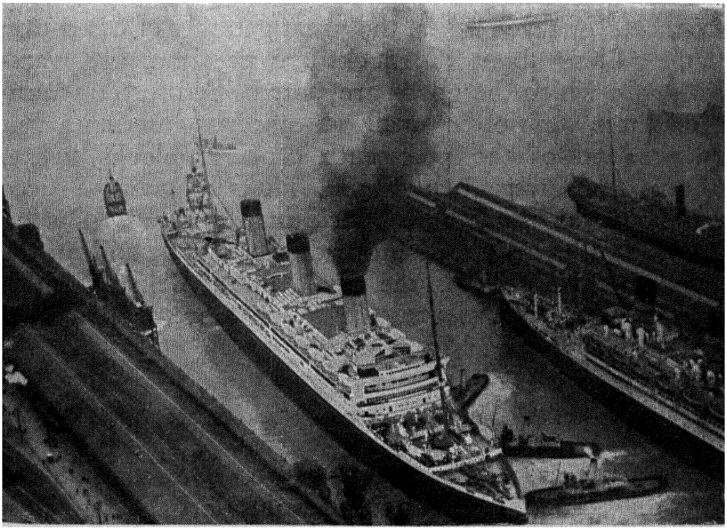
There is, however, the danger that as they are freer from competition they may charge high prices, and one of the very difficult problems of all Governments of to-day is to enable people to secure the advantages which these great trusts and combines can bring, and at the same time prevent them from being harmful to the consumer.

(2) Sir Samuel Cunard and Shipping

Eight years before the *Sirius* and the *Great Western* fought out their race across the Atlantic for the honour of being the first ship to reach America under steam, a young Nova Scotian named Samuel Cunard drew up a scheme for a regular line of steamers linking the Old and New Worlds. For eight years his scheme was ridiculed as an idle dream. Then the success of the two steamers made people think rather differently, but in the New World there were still none willing to put money in such a venture. Samuel Cunard went to London. He was a persuasive talker, arguing that it was quite possible to have lines on the ocean similar to lines of railway. " Only," with a smile, " the pair of metal rails essential on the ugly uneven land will not be necessary on the beautiful level sea."

His chance came when the Admiralty announced that the American mails, hitherto carried by Government gun-boats, would be transferred to steam packets should a satisfactory service be established. Two engineers and shipbuilders, George Burns and David MacIver, joined him; together they raised £270,000 capital and founded the Cunard Company which was given a seven years' contract by the Government to carry the mails.

In July, 1840, the *Britannia* steamed from her moorings in the Mersey amid great excitement. She was the "wonder-ship" of her day, 207 feet long, with 740 horse-power engines, and with room for 115 cabin passengers. She made the journey in fourteen days eight hours, establishing a record. To-day the Cunard liner, *Mauretania*, is 790 feet long, carries 2000 passengers, has 70,000 horse-power engines, and has done the passage in four and a half days.



[*Central News*

Docking mammoth liner S.S. "Majestic."

The *Britannia* was a wooden paddle steamer, the *Persia* (1885) the first iron ship, still on the paddle principle, and the *China* (1862) the first screw steamer. Steel ships were not built until the '80's, and the twin-screw steamers appeared in 1900.

Ships grew not only in size but, as manufactures grew, also in number, and harbours and docks naturally grew in proportion. In Defoe's day the docks at Liverpool only covered half a mile or so ; by 1900 they stretched for seven miles, the great gateway of the cotton trade. Close about the docks are the immense warehouses in which the goods are stored. Before the steamship, these were often small one-storeyed buildings, but by the end of the nineteenth century, blocks twelve storeys high were being built, like the great tobacco warehouse at the Stanley dock in Liverpool. During this period, many great shipyards were made and on the Tyne and the Tees, on the Clyde and at Belfast, British shipbuilders have constructed much more than half of the total of the world's shipping.

(3) Charles Dickens and Literature

There were many great writers of prose and poetry during this long period of Industrial Revolution. The greatest of the poets, Keats and Shelley, did not set out to picture their own times. Keats was a passionate romantic, steeped in Elizabethan and Stuart literature; Shelley a beautiful wild rebel—" some changeling from the land of Faery." But in prose, quite apart from historians like Macaulay and political economists like David Ricardo, the successor of Adam Smith, there are many records of the nineteenth century.

Jane Austen wrote inimitably of " the comedy of

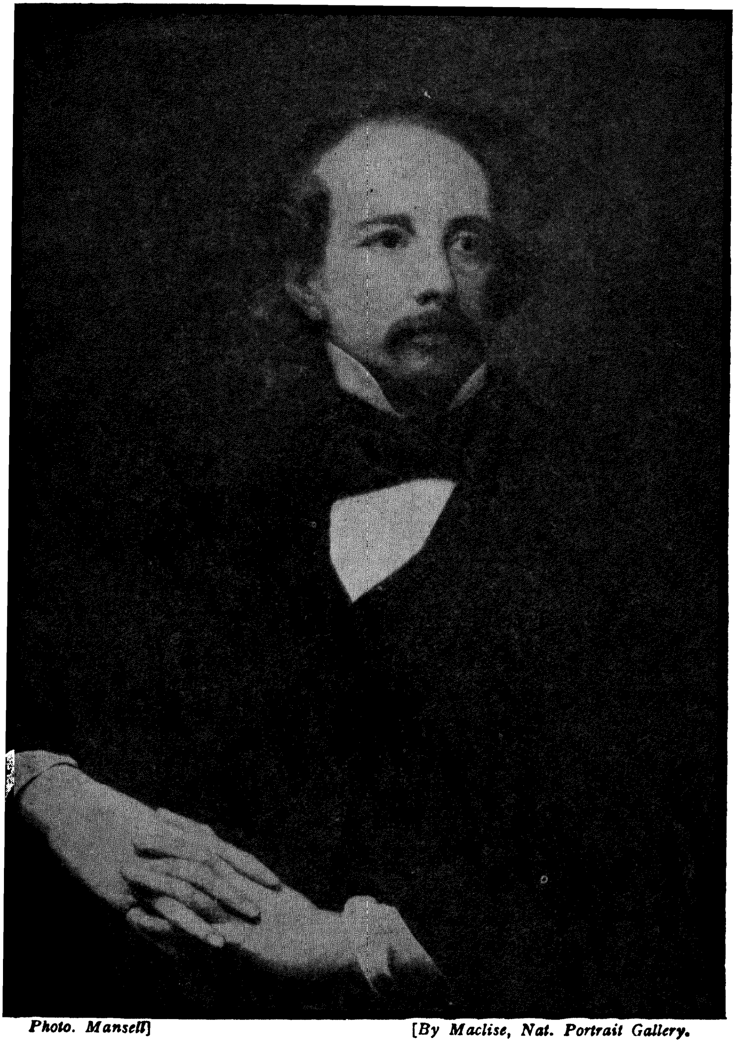


Photo. Mansell] [*By Maclise, Nat. Portrait Gallery.*

Charles Dickens.

[*Mansell*

Little Nell and her Grandfather, characters from "The Old Curiosity Shop."

manners" in the little country towns and villages. The parson, the doctor, the lady of the manor, the little snobs aspiring to be "county," the unlettered merchant uneasy in his money, the ineffectual man of letters harassed by poverty—all these and their families, typical of their age yet alive for always, move through Miss Austen's novels. George Eliot (whose real name was Mary Evans) pictured cottage life in the middle of the century, while Thackeray wrote primarily of Victorian society.

But the most popular novelist of his time, and the one through whom we can learn the most about that time, was Charles Dickens. He was born at Portsmouth in 1812, the son of a navy clerk, an easy-going, careless, kind-hearted man, who went bankrupt and was carried off to the Marshalsea debtors' prison when Charles was ten. Charles had to go to work in a blacking-factory, where he spent long hours pasting labels on pots in a dark damp room and learnt first-hand the misery of child labour. Later, such schooling as he received taught him something of the horrors often attending education in those days, and of both he wrote. People who had never considered the problem before were made to think of the cruel position of children when they read of the hardships and terrors Oliver Twist endured, the crushing responsibilities thrust upon little David Copperfield and Florence Dombey, the shame and fears of Pip in *Great Expectations* and of Amy Dorrit, and the awful conditions the boys lived under in Dr. Blimber's and Mr. Squeers's schools. These and many other children in Dickens's books did a very great deal to help Lord Shaftesbury in his campaign for children's rights.

In the movement to raise the standard of life in the slums, Dickens also helped. He knew, for he had lived in, the mean grim streets of London where, (in spite of high rates raised to supply relief,) poverty and starvation stalked in rags and dirt, an easy prey for disease and crime. He knew, too, the glittering roadways of the West End, and there, as there were few paupers, the poor rate was low. It was he who suggested the equalisation of rates, so that all the city should share in fighting the problem of the poor.

[Mansell

Sam Weller, a character in the "Pickwick Papers."

Law reforms, too, found in him an ally. From his father's imprisonment in the Marshalsea he learnt of debtors' prisons and made many others see their injustice and cruelty through Mr. Micawber and Little Dorrit. As a young struggling journalist he had seen something of the justice in the Chancery Division, and against that, too, he launched an attack in *Bleak House*.

But for all this he was a novelist rather than a propagandist, and more, a great humorous novelist. He wrote of the sorrows of the streets but also of their rich laughter; he attacked the abuses in his England, but he wrote also of her glories, and in doing it he painted a great gallery of portraits and caricatures which will be loved for themselves long after the causes they championed have grown dim.

CHAPTER XXIV

THE AGE OF THE MOTOR CAR, FLYING AND WIRELESS

Daimler, the Wrights, Marconi

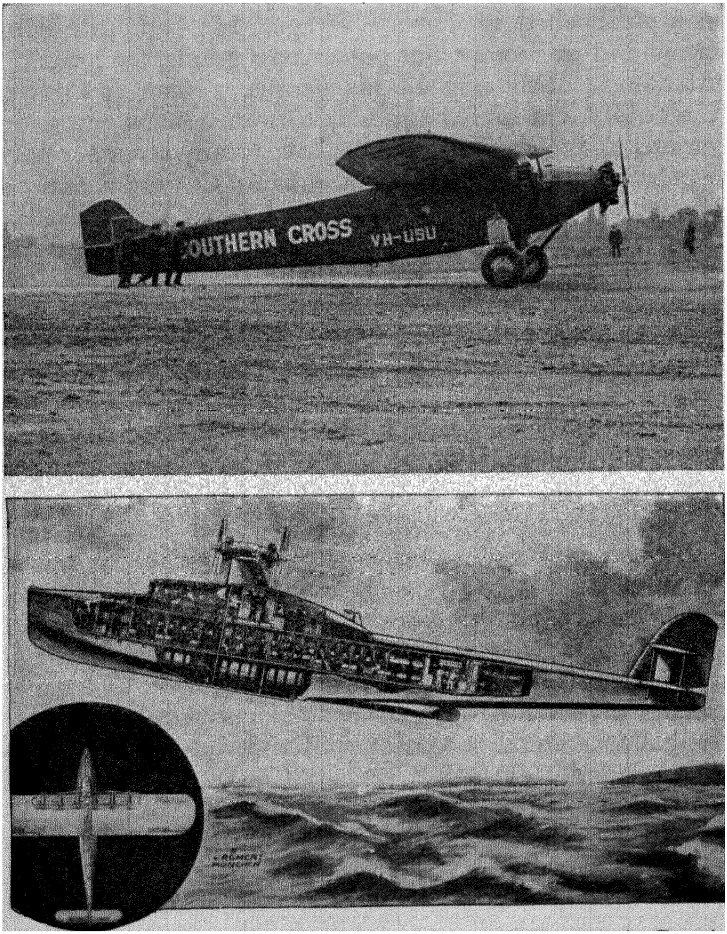
THE *bicycle*, so popular in the late Victorian era, did not long enjoy undisputed possession of the roads. For in 1884 Gottlieb Daimler invented the *petrol engine*. At first it was fixed to the bicycles themselves, but very quickly the motor car followed. In some the driver sat perched up behind the passengers, the steering being done by a lever like a boat's tiller, and none was covered in, though some had round striped umbrellas or small awnings stretched above them. These vehicles, which at first could only move at about eight miles an hour, were considered highly dangerous, and in England a law was passed that a man carrying a red warning flag must walk along the roads in front of them! Naturally motoring did not make very great progress in the country until this law was abolished, by which time Daimler had greatly improved his invention and others, too, were building successful machines which were widely used on the continent. Then England awoke to the fact that the *motor car* was not an odd sort of toy, but an important practical invention. She began to manufacture cars and motor-bicycles herself, and to-day has an important and thriving motor industry.

Many men have made fortunes and become famous through this industry, one of the best known of them all being Sir William Morris. As a boy he repaired bicycles in a small shed in Cowley village. He had little education and no money, but possessed a genius for practical mechanics. Believing in his genius, a man at Oxford University lent him the money to start a small repairing garage, and to-day his factories cover many acres not only in Oxford but also in Birmingham, Coventry and in France. A new Morris car is born every few minutes; the work gives employment to thousands of men and has earned a baronetcy for the boy who repaired bicycles.

Meanwhile, having mastered the land and the sea, man has turned to the air. The idea of flying was very old, dating back to the great days of Greece hundreds of years before Christ, but the first real step towards the conquest of the air was made in 1783 when balloons filled with hydrogen gas and also fire balloons were invented.

Two French scientists, the Montgolfier brothers, sent a sheep, a cock and a duck up in a fire balloon to amuse Louis XVI, and two years later (1785) another Frenchman, Roziers, lost his life trying to cross the Channel in an hydrogen balloon. About forty years later, coal gas was used to fill balloons instead of hydrogen, and many ascents were made, but journeys were impossible because the balloons could not be steered and were at the mercy of the wind. Then a German, Count Zeppelin, constructed the first steerable (dirigible) " balloon " in 1900. This was a cigar-shaped airship fitted with two powerful petrol engines driving propellers like those of a ship, which could force the *Zeppelin* against the wind whenever necessary.

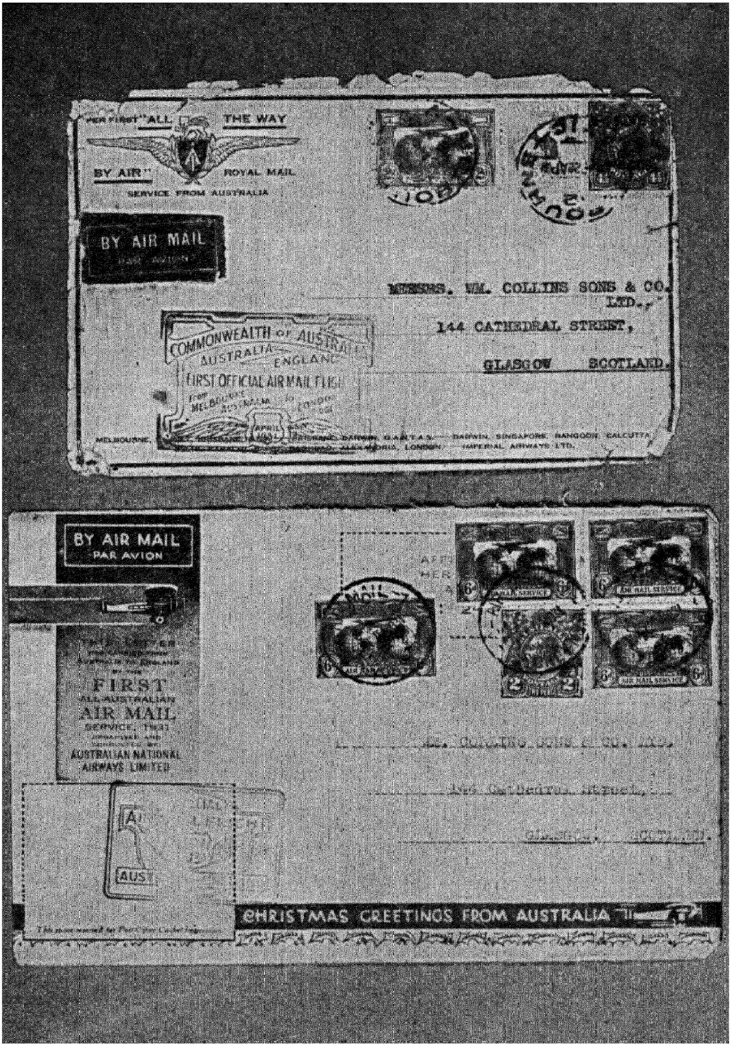
But these airships were very large and very costly and several men were needed to work them. Other



ABOVE.—*The Famous " Southern Cross."* BELOW.—*A Dornier Flying-Boat—sectional view.*

inventors were trying to find a simpler way through which one man could fly by himself like a bird. Here the great experimenters were two Americans, Orville and Wilbur Wright of Dayton, Ohio. At first they used an arrangement of planes like an *aeroplane* without an engine, and then tried fitting a petrol engine and propeller to their machines. They worked privately, and not until they had achieved success did they make their work known. Then in 1908 they gave demonstration flights in America and in France, and within a few months many other men had taken up flying. Blériot, a Frenchman, was the first to cross the Channel in an aeroplane, while a year later (1910) the Hon. Cyril Rolls, a partner in the famous Rolls-Royce Car Company, flew from England to France and back again without landing, a feat as much talked of in its day as Sir Alan Cobham's great flight to Australia and back in 1926. In this latter year the *Imperial Airway* services to India were organised; now there are many other passenger lines in operation in most parts of the world. The small " one-man " machine was popularised when in 1930 Miss Amy Johnson, a Hull girl, flew alone in a second-hand " Moth " machine to Australia.

Before the success of the Wrights, while the motor car was still rattling along behind its red flag, a young man called Guglielmo Marconi was experimenting in a far swifter, subtler way of devouring space. His father was an Italian, his mother Irish, and he was born at Bologna in 1875. There, at a very early age indeed, he littered his nursery with toy machinery, taken to pieces " to see how it worked," but, quite unlike most small boys, he very skilfully put it together again. In his teens he began his experiments in *wireless* on his father's estate, and before he was twenty he had



Photographs of envelopes carried by air from Australia.
Above: First official air-mail flight, April, 1931.
Below: First all-Australian air mail, November, **1931.**

discovered that wireless messages could be sent for over a mile. Then in 1896 he went to London, working at first in the laboratories of Sir William Preece, and improved his invention until he succeeded in sending messages from Cornwall to the Isle of Wight, a distance of two hundred miles. Finally his great triumph came in 1902 when he sailed to Nova Scotia on the Italian warship *Carlo Alberto*, receiving messages every day from his signalling station in Cornwall and then despatching a message to King Edward across the whole breadth of the Atlantic.

Throughout the nineteenth century the world seemed to grow smaller. First canals, new roads and good coaches brought towns many hours nearer to each other; then steam on land and sea, the railways and the liners, reduced the distance between countries and continents from weeks to days or hours. And in our own age the "shrinkage" continues. Cars take the town to the country, the country to the town, airways link the continents, and wireless sends voices around the world. Education, too, has had a hand in the process. In Defoe's England there were many who had never heard of Australia, and would not have been able to read the name.

To-day there are people in the British Isles who hear speech in Australia, while the newspapers tell us daily of the news from that great and far-off Dominion.

Britain's influence during the modern period we have been studying has been overwhelming. The world has been practically freed from the fear of famine; the filthy, insanitary, plague-ridden towns of earlier times are replaced in modern industrial countries by cities properly drained, provided with adequate water supplies, and from whose streets the scavenger dogs no longer find sustenance by picking over the refuse. Child labour and long working hours had existed for long years before the industrial revolution. Hours worked in a factory, however, were continuous, and the work more disciplined. Thus they were more harmful, and this was noticed by sensible decent people, and by legislation conditions were quickly altered.

England led the way in passing Factory Acts to protect both children and adult workers, and English Trade Unions have served as examples for industrial workers in all other countries. Man still earns his bread very largely by the sweat of his brow, but much less so than ever before in the world's history, while he earns more and better bread and some cake also. The English industrial inventions of the eighteenth century are the foundations on which have been built this improvement in man's material and physical welfare.

PART VII

PRESENT DAY HISTORY

CHAPTER XXV

BRITAIN AND THE WORLD SINCE 1900

§ 1

JUST as we had a great Industrial Revolution in the eighteenth century and a Transport Revolution in the nineteenth, so we are now in the midst of another series of immense changes in these early years of the twentieth century.

They began before 1914 and even just before 1900, but the World War gave them a great push forward. You have read of the electrical discoveries and of the construction of the dynamo in the nineteenth century. It is from these early electrical developments that one of the two most important changes has since taken place. *Electricity* was first used for lighting purposes. Then about 1895 electric trams began to appear in our city streets. Later in all great industrial areas, in England and in other countries, this new power was applied to drive machinery in factories and workshops.

At first, electricity could only be produced where there was coal to provide steam to drive dynamos; but engineers have invented the water-turbine, which enables them to use the force of falling water to drive dynamos and so to generate electricity in that way and without coal and steam. Now, in many hilly countries where there is much water power, in Switzerland and Norway, in Wales and Scotland, in Canada and in parts of the U.S.A., water power is being changed to *electric power* for lighting streets, houses and works, driving trains or trams, or driving machinery in factories, and it is being distributed over immense areas.

Electricity is not, however, the only new source of power which has been brought into use, mainly since 1900. About this same time the strange sight was seen of a man with a red flag walking along the road in front of a horseless carriage. Engineers had succeeded in making an engine which could be driven by *petrol.* Progress at first was slow ; the early motor cars were very unreliable, and comic papers of that time were filled with pictures making fun of the plight of drivers and stranded cars. They rapidly became more efficient, and the manufacture of motor cars and motor lorries is now one of the world's great industries.

Thus, in a manner, we have returned to pre-railway days. When railways came into use, the country inns with their great stables were gradually deserted; innkeepers, ostlers, postboys and coachdrivers lost their work. To-day, the roads are busier than they have ever been. Old country inns flourish once more, and many new ones have been built, while great garages and petrol stations take the place of the stables of old times. In England, thousands of miles of roads have been rebuilt and many new ones, wide and with smooth dustless surfaces, have been made to carry the immense and ever-growing traffic brought into being by the petrol engine.

But not only on land has oil proved to be a new and useful source of power. Already many of the world's great cargo steamers are being driven by oil, and the

White Star Company has recently launched an Atlantic passenger liner, the *Britannic*, a vessel of 27,000 tons, which is the largest oil-driven ship yet built in any English shipyard.

Thus, while the nineteenth century was a century of coal and steam, the twentieth promises to be one of oil and electricity.

The petrol engine has made possible the *aeroplane*, which has already revolutionised our ideas of warfare, and may also in the future become a most important method of transport and travel. In Flying there have been many improvements. Planes are more reliable and more stable, regular air services have been established, and small planes are now on the market for private owners. Remarkable long-distance flights have been accomplished by daring pilots—Sir Alan Cobham round Africa (1926), Colonel Lindbergh across the Atlantic (1927), Miss Amy Johnson from England to Australia (1930), and Kingsford Smith across the Pacific, and later the Atlantic, thus flying round the world.

In December, 1901, Marconi had succeeded in conveying signals across the Atlantic by means of electric waves, without the use of wires. His system of *wireless telegraphy* saves many lives, enabling ships to communicate with one another at a distance and to summon help when in distress. *Wireless telephony* soon followed; and speech was conveyed across the Atlantic by the electric waves in 1915. It was not, however, until after the War, from 1920 onwards, that wireless telephony, in the form of systematic *broadcasting* from central stations, introduced a new kind of entertainment and news service into the homes of the people, and brought far-off farms and cottages into immediate communication with the capital and the rest of the world.

Telephonic communication is now possible between London and Canada, and London and Australia.

A still greater wonder was shown to the world when Mr. J. L. Baird demonstrated his *Television* apparatus. This invention enables one to *see* by wireless. Television sets are now marketed and the British Broadcasting Corporation in July, 1930, gave a play which was broadcast so that, the actors' faces were *seen* at a distance, by people possessing the Baird apparatus, whilst their voices were heard " over the ether."

The Fultograph was also invented, enabling photographs to be sent by telegraph and reproduced on a machine at the other end of the wire. This speeded up newspaper illustration of events.

Photographs were also transmitted by wireless waves, and aeroplanes, trains, ships, etc. were shown to be capable of navigation by wireless waves directed upon them.

§ 2

Even before 1900, the forces of intense competition, and the greater cheapness and efficiency gained by manufacturing on a very big scale, had already produced many *large businesses*. In trade, in commerce, and in manufacturing, this building up (often by amalgamation) of large businesses has gone much further during the twentieth century. In Germany and in the United States the process has gone further than in England, where many people are saying that we are losing ground through not bringing our business methods up-to-date quickly enough.

However, some wonderful developments have taken place in this direction. All important British firms manufacturing chemicals have been combined together through the efforts of the late Lord Melchett into one huge concern known as Imperial Chemical Industries, Ltd.; this great business is valued at more than £100,000,000, an amount so vast we cannot really conceive of it.

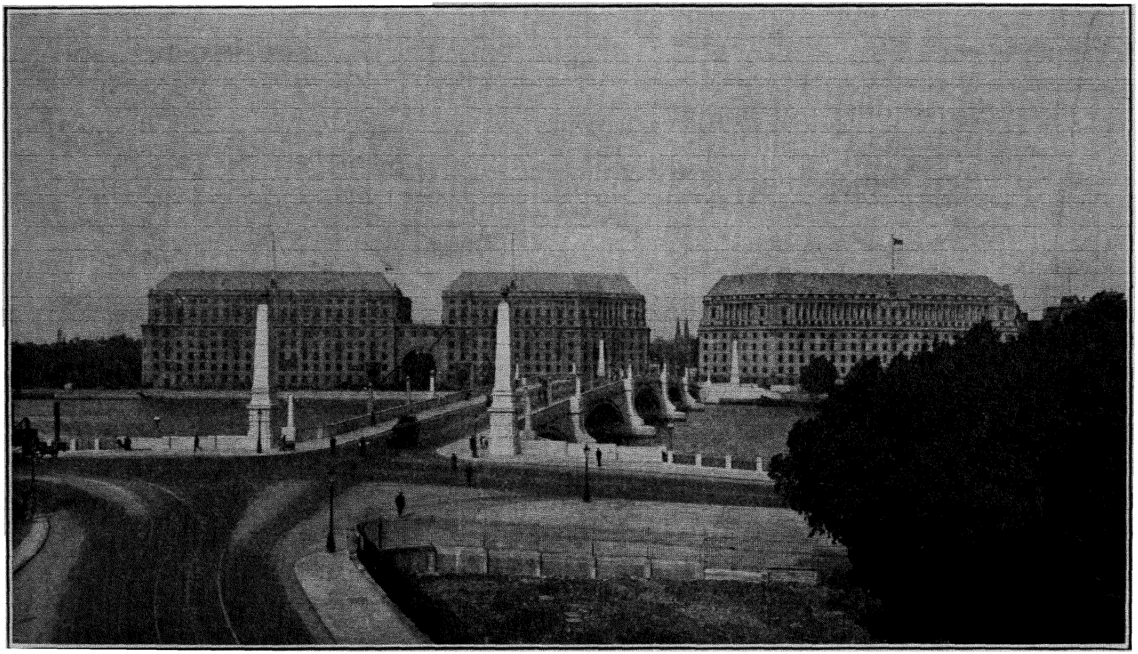
A small soap firm founded by William Hesketh Lever (the first Viscount Leverhulme) in 1885 has gone on from strength to strength, increasing its own size and buying or amalgamating with many other firms. It owns vast plantations of palm oil in the Belgian Congo, and Nigeria, hundreds of thousands of acres in the British Solomon Islands for coconut cultivation, and a great whaling fleet which works in the Antarctic. There are over 230 companies associated with Lever Brothers Limited, with factories or agencies throughout the world. Its capital is more than £70,000,000 and it employs some 85,000 people.

Similar growths and combinations are taking place in other industries, in iron and steel, in cotton and in coal-mining; so far, however, these have been on a smaller scale and have taken place more slowly, and it is in these industries that we may expect the greatest changes to take place in the future.

Great amalgamations have also been effected in transport and in commerce. Five great railway companies own almost the whole of the British railway system, and for many purposes they act together and form one huge railway organisation.

Five great banks with branches in almost every town in England do most of the banking business of the country, and many times as much as was done by over a hundred banks in 1890.

The word "rational," means sensible, reasonable and thoughtful; and to "*rationalise*" an industry means to think of it as a whole, to consider its sources of raw



Courtesy] *W. T. Glover & Company, Ltd.*

A view of Lambeth Bridge. In the background are Thames House and Imperial Chemical House, two of the great new office buildings on the Thames side at Westminster.

material, to make use of only the best and most up-to-date factories and machinery and get rid of the inefficient, to study all the possible uses and markets for its produce and to unite the whole industry in producing what can be sold at reasonable and profitable prices.

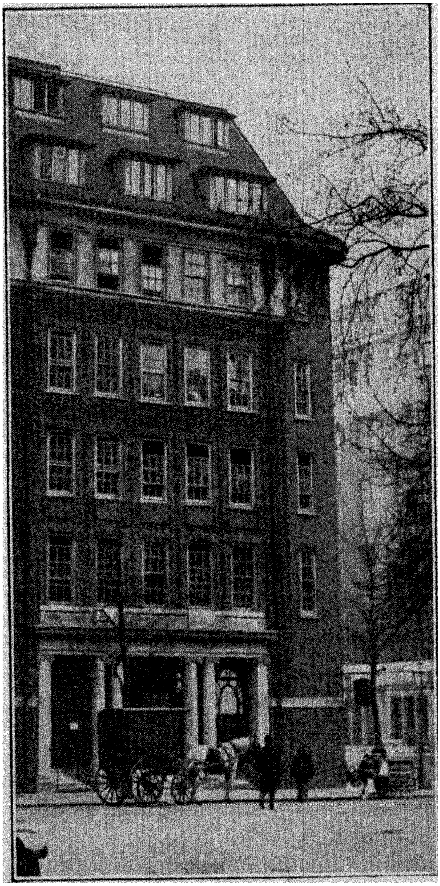
This is what Lord Melchett aimed at in forming "Imperial Chemical Industries, Ltd." It is what the Electricity Commissioners are now doing in supplying electrical power from a few great power stations for the whole of Great Britain. By "*rationalisation*," then, we mean organising as intelligently and as well as we can, not just one or two businesses but a whole industry. These are very difficult tasks, but they are offering wonderful opportunities to intelligent and ambitious young men.

§ 3

While the engineer, the manufacturer and the business man have been engaged in these developments, the wage-earners have also been acting in their own interests, and in two main directions. In the *Trade Union* world, there have also been amalgamations; great unions or federations of unions have been formed, strong enough to give their members support against the most powerful of Associations of Employers. Further, the Trade Unions and other associations of the workers have taken an increasingly active part in political affairs both national and local.

In the nineteenth century, the strong Unions were those of the skilled workmen, the engineers, or joiners and carpenters. They recognised only those who had served a full apprenticeship in their trades and took little interest in the unskilled and semi-skilled workers. But their work has been taken over, more and more by semi-skilled men operating machines, and since 1900 all grades have found it necessary to organise together. Thus there has grown up the Furnishing Trades' Federation, the Builders' Union, the Transport Workers' Union, the Miners' Federation, and the National Union of Railwaymen, each of which unites skilled, semi-skilled and unskilled workers in its ranks.

A section of the workers has believed for a long time that all land and capital, the banks, the railways, the mines and the great manufacturing industries should be owned and managed by the State. That is, they believe in what is called "*nationalisation*." Their number has grown very considerably since 1900, but the more



[*Topical Press*

Transport House, London.

thoughtful members are less sure than they were of how this is to be done, and are certain it cannot be done in a very short time. Such changes could only be carried out by Parliament, and socialists, therefore, have always been very active in stirring the workers to take part in political affairs. In addition, many wage-earners who were not necessarily socialists have believed that their position could be greatly improved if they had more power in Parliament and in local councils. Thus from these two streams there has grown up the strong and important Labour Party.

In 1924, the Labour Party was strong enough to form the first English Labour Government, which lasted nearly a year. A second Labour Government took office in 1929.

In 1926 the Trade Union leaders took the desperate step of calling a *General Strike* of all the organised workers in England in support of the miners who were themselves then on strike or " locked out." This meant an attempt to starve the country into agreeing with the Trade Unions, for no food was to be landed at the ports or carried by the railways. But volunteers worked at the docks, drove lorries, distributed milk, and in their cars carried people to business. The General Strike united every one outside Trade Unions in an attempt to be independent of such an attack on the State. It was a complete failure, and after several days it broke down.

§ 4

The *democratic Parliaments*, which in the nineteenth century were set up all over the world, in imitation of the British model, have not all been successful. Some countries—Spain, Italy and Russia, for example—abandoned them and tried a system of *Dictatorship*, which has not been seen in England since the time of Cromwell.

In Britain, however, Parliament has continued to be the sovereign power in the state, and has become more and more democratic with the passing of the years. Each Reform Act in the nineteenth century added large new classes of men voters. In 1915, during the early days of the war, Parliament gave the vote to all men over twenty-one and also to *women* over thirty years of age. In these years, women were nursing the wounded in France and Britain; they were ploughing fields, driving vans and lorries and making shells in munition factories; in fact, in every direction they were doing the work of the men who had joined the army. Thus they very truly earned their right to the vote, and their claim could no longer be denied. In 1928, the vote was given to all women over the age of twenty-one; and they were thus put on a voting equality with men.

In two ways this makes an important step in our history. The whole adult population now takes a share in the election of the British Parliament. Again, in almost every constituency there are rather more women than men, and thus the age-long period in England, during which man has been politically dominant over woman, has come to an end.

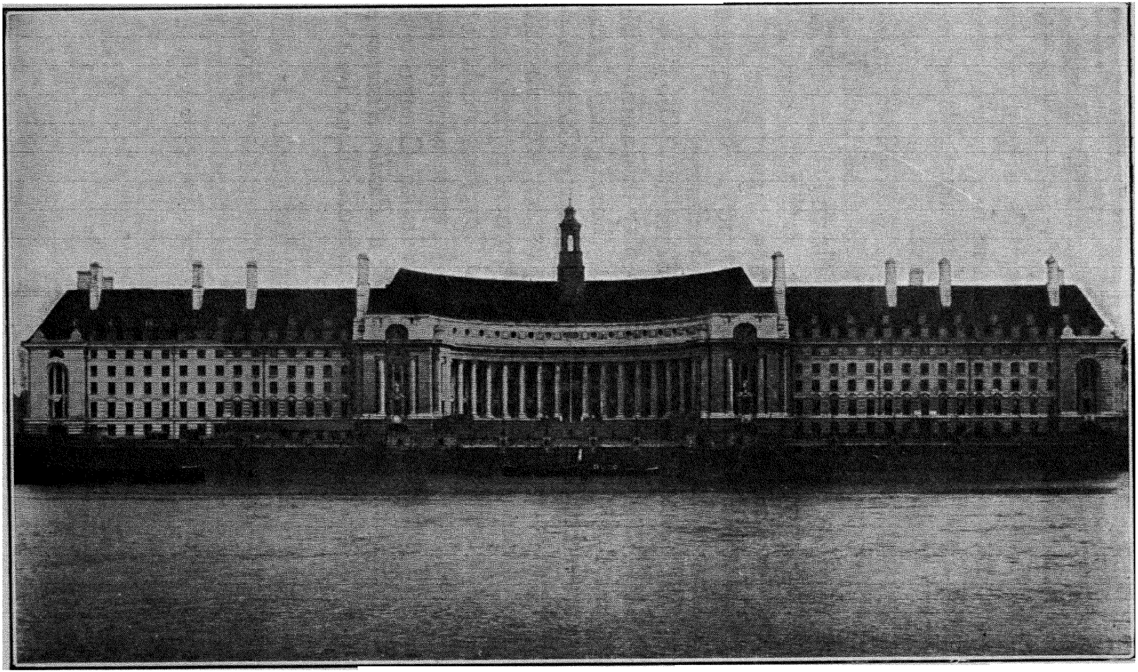
In *Local Government*, very drastic changes have been made in our methods of dealing with the very poor people.

From the reign of Queen Elizabeth, each separate parish had had responsibility for the care of its own poor. This parochial relief lasted for more than two centuries. Then, in the new Poor Law of 1834, parishes were grouped together into Poor Law "Unions," each managed by an elected Board of Guardians. This independent body had full responsibility for looking after the poor in its district. It managed hospitals, schools, workhouses; it gave help in money and in food to sick poor persons and paid doctors to attend to them. It helped families suffering from unemployment.

This system continued for nearly a hundred years. But for some years people had been dissatisfied with this quite separate treatment of poor people and their children in separate schools and hospitals; and with separate treatment for the unemployed, when many were also getting Unemployment Insurance money. The system of 1834 seemed rather wasteful and inefficient.

It was felt that all the new *Social Services*—Education, Public Health, etc.—have a part to play in dealing with the problem of poverty, and that those great Local Authorities—the City Councils and County Councils—should take over this work, especially as they were already responsible for most of the local government in their area. This has now been done in the Local Government Act of 1929. Each local council, just as it must appoint an Education Committee, or a Public Health Committee, must now also appoint and control a ***Public Assistance Committee*** to undertake the work previously done by the Board of Guardians.

Thus, an old English institution has gone. It was necessary for the change to be made, but we ought not to forget that it did good service in its time and that many of the Guardians did their work extraordinarily well.



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County Hall, Westminster.
Headquarters of the London County Council, on the bank of the Thames.

CHAPTER XXVI

THE PROBLEM OF UNEMPLOYMENT

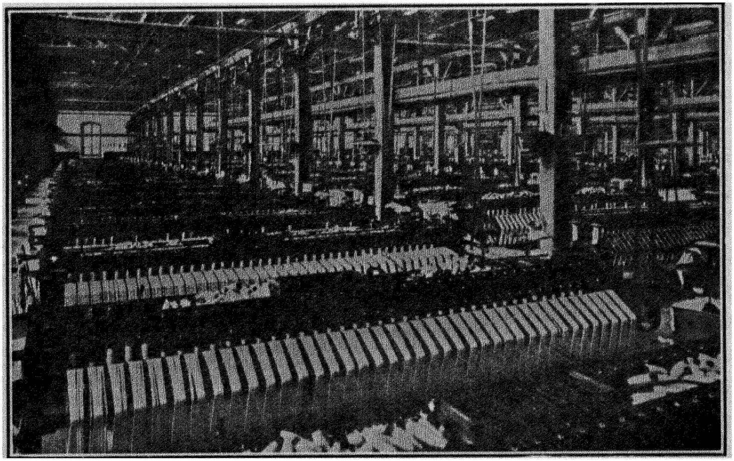
§ 1

THE great changes of which we have read have not succeeded in preventing unemployment, which has been very severe since the end of the Great World War in 1918. Since that time there has seldom been less than a million people unemployed in Great Britain, and sometimes the figure has risen as high as two millions. This is a serious risk for those unemployed and for the country as a whole. Those out of work lose their skill and energy and gradually sink into despair through having nothing to do. The country is without the fruit of their work and yet has to maintain them.

It is very difficult to say what are the real causes of the serious unemployment which at times affects every industrial country. There is nothing which would do so much to take unhappiness from the world of to-day as a successful solution of the difficulties in industrial life which help to produce unemployment.

Let us try to understand some of the causes. Many of our customers, and especially Germany, were made much poorer by this long period (1914-1918) of destructive warfare. Again, war and revolution have so upset Russia that the work which used to come to our engineering firms, making machinery for Russian mills and factories, making ploughs, binders, tractors and other agricultural machinery, has almost disappeared.

Again, many countries used to buy great quantities of manufactured goods from Britain, but during the war period they pushed on their own industries rapidly, and most of them have also since then put high taxes on foreign goods. This has happened in India, Japan, and South America and in other countries. The British manufacturer thus finds himself shut out from many foreign markets which were open to him before the War.



[*Exclusive News Agency.*

The interior of an up-to-date Cotton Spinning Factory in Japan.

We have seen that countries are no longer dependent for their power on coal and steam. To the world in general this is a great benefit, but the change is an important cause of British unemployment. British coal is required less for shipping when many ships now burn oil. Countries such as Norway and Switzerland, without coal of their own, were previously dependent on countries like Britain for their manufactures. To-day, with its ample supplies of water, Norway is producing electric power not only for its own new manufacturing industries but also to distribute to other countries in Europe.

Thus the power to manufacture is now much more widely distributed. Goods can be made more cheaply. The world as a whole gains; but in the meantime British miners and British engineers are unemployed.

When a new business is started, it can have the best methods and the best machinery known at the time. In those countries which have recently started their own manufacturing, all their equipment is very modern. In older industries in Britain—where the Industrial Revolution began—many of the firms have old-fashioned and inefficient plants and find it hard to compete against new and up-to-date businesses established in other parts of the world. The Lancashire cotton trade is divided among hundreds of firms all competing with one another in business. In Japan, a new and very large cotton industry has now grown up. But this is entirely controlled by four firms, and they have captured from Lancashire much of its large trade with China, while Lancashire spinners and weavers are unemployed.

Again in pre-war days, British investors lent great sums of money to foreign countries to build docks and harbours, to construct railways, to make factories and works. English engineers provided the iron and steel for bridges and railways and the machinery for the factories. We are now lending less, and the United States of America is finding more of the world's capital and is capturing some of this work in building up the industries of new countries.

During the war, the prices of goods rose very high indeed, but since 1921 prices have been falling. This long period during which the prices of goods have been sinking lower and lower has been one of the most serious causes of unemployment. Trade is kept going by merchants who place orders with manufacturers for things they hope to sell at a profit. Their orders are often given many months before they receive and sell the goods. If, after they have bought, prices fall, they will lose, and may lose very heavily on their bargains. Thus it is seen that, when prices are falling, the adventurous trading spirit is checked, merchants reduce their orders, manufacturers have less to do, and workpeople are unemployed.

§ 2

Those then are some of the reasons why there has been so much unemployment in Britain since the war, and why, in particular, those great industries on which our nineteenth-century prosperity so much depended—coal, cotton, and engineering—have suffered so severely.

On the other hand, road transport and electrical power are making many *new industries* develop in parts of England where they did not exist before, and are giving some prosperity to other parts where the older industries are still having a poor time. Particularly in the counties near London, there has been a wonderful growth of new industries, and that area has been steadily prosperous and with little or no unemployment. The West Midlands and the Black Country have shown a splendid capacity to adapt themselves to new conditions. Unemployed miners, and iron and steel workers have found themselves absorbed into new motor and electrical industries.

Again, in the open fields in rural counties, huge factories have been built with neither railway nor canal near to them. They get their power through a wire cable from an electricity station miles away, and they send away all their products by road. You will see from this how the British manufacturer is adapting hinself to the new conditions, and how industrial work even in Britain is spreading away from the coal and iron areas where it first grew up in the eighteenth and nineteenth centuries.

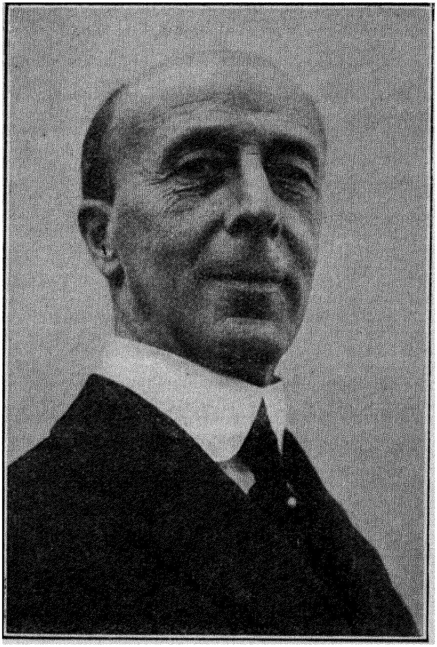
Thus there are signs that our post-war difficulties are beginning to pass away. The leaders of industry in the new trades are showing courage and enterprise. In the older industries—in cotton, coal, and iron and steel—great amalgamations are taking place. Soon we may expect each of these industries to be made up of a small number of very large, powerful and well-equipped firms, well able to hold their own in the world's markets.

The study of history should help us in meeting successfully the changing conditions of the twentieth century. It shows us that our astonishing prosperity in the nineteenth century was partly due to the long start which we had over other nations in the use of steam power, and partly to the courage and the enterprise of our manufacturers and merchants. Our first advantage has now gone. We have seen that new sources of power are spreading industrial activity much more widely over the surface of the earth and more new sources may still be discovered.

Only an educated population working together on a common policy will win through successfully. We have had to adapt ourselves, many times in the nineteenth century, to new conditions. We did so successfully, and we ought to be able to do so again.

§ 3

While every one agrees that we must improve our industrial methods, there are some who think this will



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The Rt. Hon. Reginald McKenna.

not succeed unless we abandon our *free trade* policy adopted from the middle of the nineteenth century. They believe that much unemployment is due to the sale of foreign goods in Britain which have been made by workers abroad earning low wages or working long hours. This "unfair" competition, they think, should be stopped. They also say that large quantities of surplus goods, which manufacturers abroad cannot sell in their own countries at a profitable price, are being "dumped" in England and sold at a very low price.

A tax on such goods is believed by some to be necessary to secure employment at good wages for British work-people, and so this policy is called "*safeguarding*." During the War, in 1916, taxes known as the McKenna duties were placed on many articles in order to reduce our imports and so save money and cargo space when both were urgently needed. Then, since the War, a Conservative government placed safeguarding duties on motor cars, lace goods, pottery and several other manufactures. Some of these were removed by the second Labour Government.

But it is interesting to keep in mind the fact that foreign countries have always bitterly complained of our "dumping" of cheap goods on their shores. In the Mediterranean countries "dumping" is always spoken of as "the English policy." Some people oppose "safeguarding" because they say that taxing of imports will make it harder and not easier for us to manufacture cotton goods, machinery, and ships cheap enough to sell them in foreign markets.

Thus, the case for *Free Trade* or for *Protection* is still being warmly debated to-day.

In 1931 there was a grave financial crisis in this country, due partly to world-wide unrest and depression. The second Labour Government was succeeded by a National Government with Mr. Ramsay MacDonald as Prime Minister.

In order to initiate a "new policy for a new era," one of the first acts of the National Government was to prepare a new Trade Bill and arrange for a *Conference of the Dominions*. "We propose," said the Chancellor of the Exchequer in introducing the Bill (Feb. 1932), "by a system of moderate Protection, scientifically adjusted to the needs of industry and agriculture, to transfer to our own factories and our own fields work that is now done elsewhere, and thereby decrease unemployment in the only satisfactory way in which it can be decreased." It is interesting to recall the fact that the Chancellor of the Exchequer, Mr. Neville Chamberlain, is a son of Joseph Chamberlain who a generation ago conducted a campaign in favour of "Imperial Preference and Tariff Reform."

CHAPTER XXVII

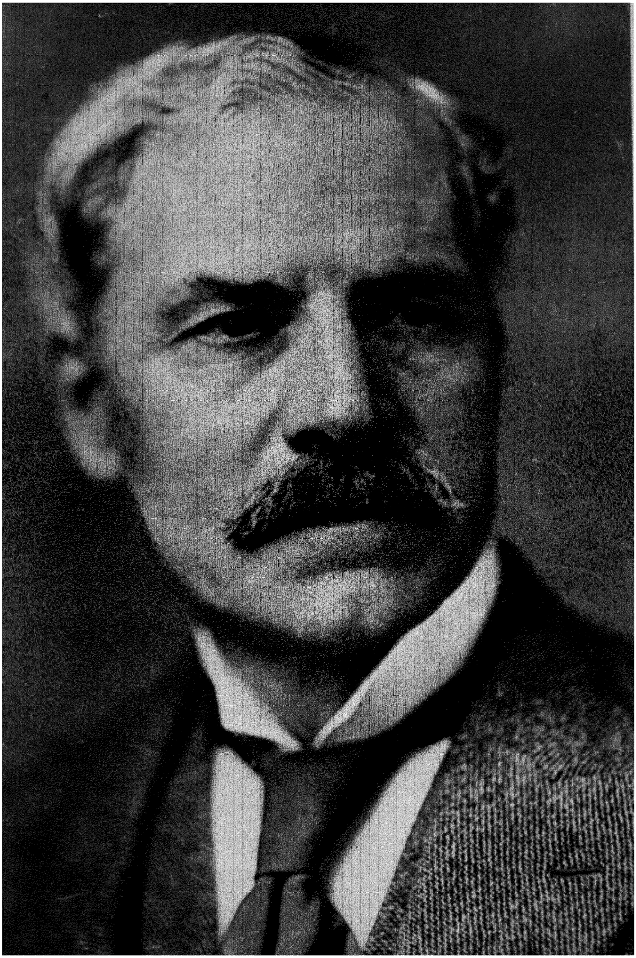
THE BRITISH COMMONWEALTH OF NATIONS SINCE 1900

§ 1

DURING the twentieth century, the great self-governing Dominions of the British Commonwealth of Nations continued to grow in importance. The ties which bind the various members of the Commonwealth together are very loose and vague; but the Great War (1914-18) showed all the world that the Dominions value their connection with Great Britain, and are bound together by mutual interests and affection.

All members of the Commonwealth sent bodies of troops to fight beside the Allied armies in the Great War; and the Treaty of Versailles (1919), which concluded the War, was signed separately by each of the Dominions—except the Irish Free State which was not formed till 1921. Further, all the Dominions are independent members of the League of Nations.

The *Imperial Conference* held in London in 1926 laid it down that the Dominions were in no sense subject communities, but "equal and autonomous" (self-governing). The Governors-General, who represent the King in the Dominions, must act on the advice of Dominion ministers, as the Kings acts on the advice of his ministers in London; and the London Government cannot advise the King against the advice in Dominion affairs given him, through his Governors-General, by Dominion ministers.



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Rt. Hon. J. Ramsay MacDonald, Prime Minister in the National Government set up in October, 1931.

In other words the Dominion Governments are masters in their own lands. They are not to be committed to obligations under any treaty by the London Government, without their own consent. They may, and some of them do, send their own ambassadors to foreign capitals.

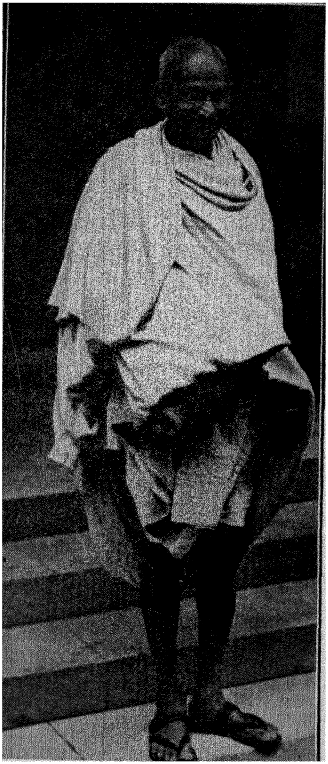
The right of His Majesty's Privy Council to act as the ultimate Court of Appeal for the Commonwealth, and to hear and give judgment on certain cases sent from the Dominions, was at the 1926 Conference called in question. The matter was left over to be brought up again at a later Conference, the London Government having declared that it had no wish to force anything at all on the Dominions contrary to their inclination.

So, finally, in 1931 the National Government in London passed the *Statute of Westminster*, which legally recognises the Dominions as entirely *Free and Equal Partners* with Great Britain in the *Commonwealth of Nations* (which is now the official name of what was once called the British Empire).

Thus the only formal tie remaining is that the Dominions owe allegiance to a common Crown—the symbol of the Commonwealth's unity and of its common traditions.

§ 2

You have read how the British gradually became the rulers of *India*, and how the State gradually took over the powers of the old East India Company. The Secretary of State for India, with his office at Whitehall, and the Viceroy representing the King at Delhi, are still, as they have been since the Mutiny (1857), the principal figures in the government of India; but efforts have been made in the twentieth century to admit Indians to a larger share in the control of their country.



[Topical **Press.**

Mahatma Gandhi.

The Viceroy of India, and the Governors of the various Provinces, are assisted each by a council which helps the Governor to make laws. The Indian Councils Act (1892) authorised the addition of a certain number of Indian members to the Councils.

In 1919, an Amendment to the Government of India Act, marked the *beginning* of an entirely new policy. It introduced direct election of Indian members to the Councils by Indians living in certain areas, and grouped like British voters according to their place of residence. The vote was given to about 5,000,000 Indians, all owning a certain amount of property.

But the more extreme Nationalists in India, led by the Hindu, *Gandhi*, are not satisfied with these reforms. The great difference between the British and Indian peoples is well illustrated by the fact that the outstanding figure in recent Indian life has been Mahatma Gandhi, " a religious rather than a political leader, a saint rather than a statesman."

The Act of 1919 provided that a Commission should proceed to India in ten years' time, to examine and report. The Commission was appointed, and was presided over by Sir John Simon. The Commission's Report, published on June, 1930, is accordingly known as the *Simon Report.*

It called attention to the differences of race, customs, religion, and language, which make India in certain respects less of a unity than Europe. These differences, and the huge size of the country and of its population, most of which is completely ignorant and illiterate, make it very difficult to give India at present such a measure of responsible self-government as would satisfy the educated minority. The Commissioners consider that a large part of the work of government must continue for some time to be carried on by the British official, resident in his district, and personally known to and trusted by the Indians whose affairs he supervises.

The Commissioners started with the idea that India was in due course to become a self-governing Dominion, the problem being how the change was to be carried out. They reported that the movement towards democracy should begin first in the *Provinces*,[1] where there would be Indian ministers responsible to a Parliament elected by Indians, with full powers of government, including the maintenance of order. There would also be British both in the Parliament and the ministry, helping and advising the Indians and protecting the British interests. The Governor of the Province, sent out from Great Britain, would watch over the progress of the new Government, and would have powers to intervene if he saw great injustice being done to any section of the community, or any grave disturbance of order.

The *Viceroy* would remain, looking after the welfare of India as a whole. Through him the British Parliament and

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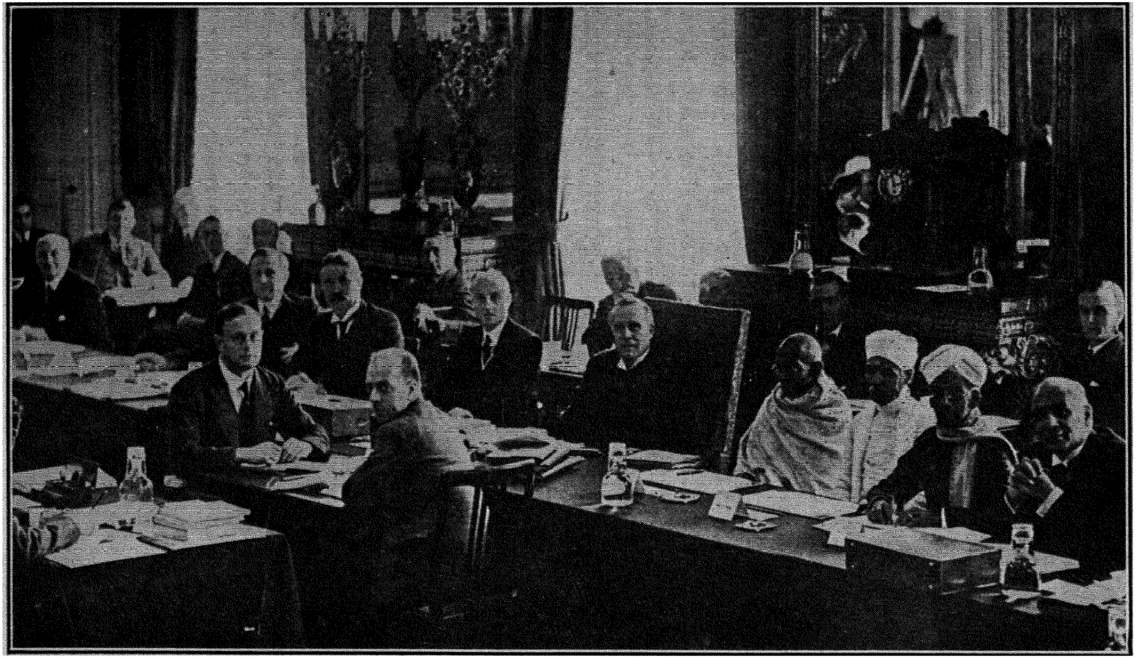
[1] India is divided into a number of Provinces; the Province of Bengal the Province of Madras, etc.



[Exclusive News Agency

The Round Table Conference in St. James's Palace.
Lord Sankey is in the Chair, and on his left sits Gandhi.

the Secretary of State for India would retain control of the Indian army, and would see to the defence of India against foreign invasion, especially on the north-west frontier.

The Commissioners also recommended that a new body, to be called the *Federal Assembly*, should take the place of the old Central Legislative Assembly. It would contain about 250 members. A certain number of these would be sent up from each Province to represent the interests of that Province. The aim should be to persuade the *Native States* also to send representatives to the Assembly, so that in time it would become truly federal, and represent India as a whole, just as Congress represents the United States.

The Commissioners had a difficult task. In India there are so many problems to consider. There is the desire (accompanied by violent agitation) of the educated Indians for larger share in the government of their country. There is the complete ignorance of the mass of the people. Opposite the name of each candidate on a voting paper little pictures or symbols have to be drawn (e.g. a Union Jack for the candidate who favours the British rule) to help those who cannot read. There is the dislike of the native Princes for democracy. There are the differences between Mohammedans and Hindoos, and between the warlike and unwarlike races. And there is the commercial and military importance of India for the Empire as a whole and for Great Britain.

In 1930-1, a *Round Table Conference* of all interested parties met in London, with the object of trying to solve these difficulties and of helping India on its way to self-government and Dominion Status within the British Commonwealth of Nations.

Burma is to be entirely separated from India, and a *Burma Conference* sat in London at the end of 1931.

CHAPTER XXVIII

THE WORLD OF TO-DAY

§ 1

THE nineteenth century had seen the growth of a greedy and rather swaggering *nationalism* among the people of Europe. Each nation seemed either to plan to attack its neighbours, or else to fear an attack from them. There was jealousy between the rival imperial dynasties of Germany, Austria, and Russia. France never forgave Germany for having taken Alsace-Lorraine (1871). There was jealousy of Britain—especially among the Germans—because of her sea power and because she had acquired the best of the undeveloped areas outside Europe suitable for colonising by the white peoples.

Then there broke out the *Great World War* of 1914-1918, in which Britain, France, Italy, Belgium, Japan, the U.S.A., Russia, and their Allies, defeated Germany, Austria, Bulgaria, and Turkey.

The war waged furiously for four years. For the first time in the history of the world, whole nations were in arms. Those who were too old or weak to fight in the line helped to make munitions at home, or worked in offices on the lines of communication. All work that was not absolutely necessary was suspended ; plant and buildings were allowed to fall into disrepair ; the pleasant arts and amenities of life were almost forgotten. In every belligerent country the air was full of hatred for the enemy—about whom wild stories were circulated—and of grief for the wounded and the fallen.

Science was applied to warfare, and weapons more deadly than any before known were devised and applied to the destruction of both soldiers and civilians. The British fleet kept up a blockade which helped to starve Germans into submission, and the German aircraft bombed defenceless towns on the east coast of Britain. Poison gas and submarines added to the horrors of war.

The cost in men and money to all the warring nations was enormous. It is estimated that there were thirty million casualties, and over seven million men were killed or died of wounds ; and £40,000,000,000 was spent on killing or maiming them !

The Peace signed at Versailles in 1919 set up several new states in Europe. The old Austro-Hungarian Empire was split up. *Austria* became a small republic centred round Vienna ; to-day she pursues an uneasy existence under the leadership of Dolfuss, and is anxiously watched by the leading powers of Europe. The Czechs and Slovaks, occupying the old territory of Bohemia, formed a new state—*Czecho-Slovakia*—with its capital at Prague. And Serbia, with the addition of fresh territory, became *Jugo-Slavia* (i.e., South Slavia). *Hungary* became an independent state, separate from Austria, but losing also many of her subjects.

Poland recovered her ancient independence, became a barrier between Germany and Russia, and gained the *Polish Corridor* (with access to the sea), passing through old Russian territory. The *Baltic provinces* of the old Russian Empire became separate states. *Roumania* was enlarged.

Altogether in the Great World War, four great Empires disappeared ; and *eleven new republics* (including the Soviet Union of Russia) took their place.

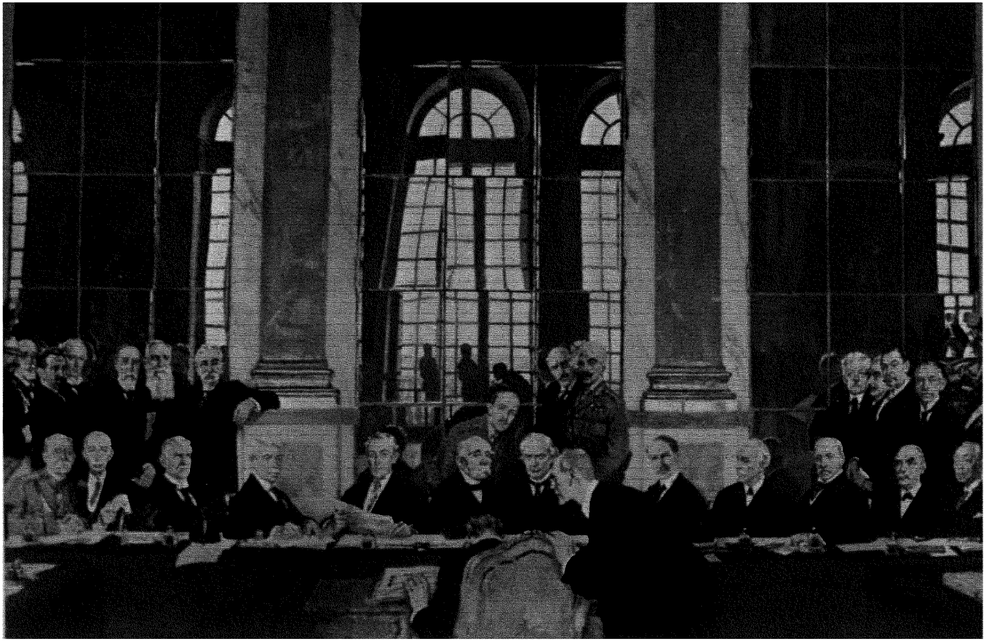
The territory of *Germany* was much diminished ; she had to give up her fleet and her colonies ; and she was condemned to pay a huge fine or *indemnity.* But the Allies found that it was not so easy to exact this fine. Ultimately Germany could pay it only by exporting goods—and these would compete with goods made in the Allied countries, and so depress their industries and increase unemployment. The terms of the " debt-settlement " or " reparations " had to be modified : the Allies reduced their demands ; and elaborate plans—like the Dawes plan and the Young plan—were drawn up, for enabling Germany to pay with the least inconvenience to all concerned.

§ 2

War hatreds die but slowly. *Germany*, after having struggled through some very difficult times, joined the League of Nations (1926) ; then later (1933) she gave notice that she would leave it. A year before, new forces had come to the surface. *Hitler* and his *Nazis* achieved a revolution with crusading frenzy, and fired Germany with new hope and aggressive enthusiasm. To-day Hitler dominates the German people as even Bismarck could not do.

§ It was a principle laid down during the war by President Wilson of the U.S.A. that a people should not be compelled to submit to the rule of another country against its wishes. The old Austro-Hungarian Empire included against their will members of many different races—Czechs, Croats, Slovaks, and Magyars. In the same way Germany governed the Poles against their will, and Britain the Irish.

The new arrangement is probably fairer on the whole. But there are still some people who have been forcibly



Sir W. Orpen. *Crown Copyright.*

The Signing of the Peace in the Hall of Mirrors, Versailles, 28th June, 1919.

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subjected to the states favoured by the victors. There are discontented *minorities* of this kind in Poland, Czecho-Slovakia, and Roumania, and as time goes on, perhaps further small changes will be made some day in the map to satisfy them. The Treaty of Versailles naturally (though unwisely) tended to favour the Allies, and those subject peoples who had been sympathetic to their cause, at the expense of those who sided with Germany. The war has thus been followed by a period of great restlessness, by tumults and revolutions and civil wars, throughout Europe and the East. In Germany, Austria, and Hungary—the countries in which there was most distress after the war—the extreme social reformers known as *Communists* have at times caused grave disorder.

In the vast *Union of Socialist Soviet Republics* (U.S.S.R.) —which is now the official name of Russia—the real control rests with the Communist party. The most significant feature of the Russia of to-day is the *Five Year Plan*, now to be followed by another five years' planning. This Plan, under the leadership of *Comrade Stalin*, is by far the most ambitious social and industrial revolution in all history, and in due time it may make the new Russia one of the most scientific industrial nations of the world.

China is still rent by disunion. Recently (1931) *China and Japan* have been fighting in Manchuria. The solution of this Far Eastern problem proved itself one of the most baffling which the League of Nations has had to face, and it led to Japan's notice to leave the League.

In Latin Europe an anti-socialist movement arose, which installed *Dictators* in Italy and in Spain; and private citizens in other countries have formed bands of Fascists in imitation of the Italian model. In 1931 Spain became a republic.

[Topical Press.

Signor Benito Mussolini.

In Italy, *Benito Mussolini*, the legal dictator, has created one of the greatest national revivals known to history. His Fascist[1] Revolution has set up a new kind of "corporative" government, in which the political, social and industrial forces of the nation are bound closely together—like the rods (*fasces*) round the axe. Fascism is a vast experiment, which all are watching with interest and some with distrust.

The new republic of Turkey, under the leadership of *Mustapha Kemal*, has, in spite of Allied encouragement of Greece, maintained her power on the coast of Asia Minor, still holds Constantinople, and is rapidly modernising herself, and adopting western customs.

The U.S.A., under the brave leadership of its President-Dictator, *Roosevelt*, has embarked on a vast revolutionary experiment to solve the banking, industrial and unemployment difficulties that accompanied the recent world crisis. What its outcome may be, none can yet tell.

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[1] From Latin *fasces*, meaning the "bundle of rods" carried as their sign of office, by certain officials of Ancient Rome.

§ 3

Great efforts have been made to heal the wounds of wars, to create mutual trust and confidence among the nations, and to establish peace in Europe and in the world.

The work of the *League of Nations* has already been described in the life of Woodrow Wilson (Book VII. of this series). There have also been several important international treaties and conferences, by which the nations have sought to guarantee peace and to limit armaments.

Since the war, repeated efforts have been made by the great powers to reach some agreement for reducing armaments. In 1921 the representatives of Great Britain, the United States, France, and Japan, met in conference at Washington. In accordance with the wishes of the United States, Great Britain and Japan agreed to terminate the formal alliance which they had concluded in 1911, in favour of a new treaty signed by all the four powers. The treaty came into force in 1922. It restricted the building of large battleships—or *capital ships*, as they are called ; and it arranged for another conference to be held to examine the whole situation anew.

At the same time efforts were being made to foster peaceful and friendly relations between the European powers. Negotiations were carried on at Locarno by the delegates of Britain, Germany, France, Belgium, and Italy, which resulted in the signing of the *Locarno Treaties* (1925). By these Treaties France, Germany, and Belgium agree not to invade each other's territories, or to attempt to alter the frontiers laid down by the Treaty of Versailles.

On August 27th, 1928, occurred an event of profound significance in the history of international relations. Nine countries signed a treaty known as the *Kellog Pact* (because it embodies proposals put forward by Mr. Kellog, an American statesman), by which they *renounced war as an instrument of national policy*, and agreed to settle all disputes that may arise among them by peaceful means.

This is all to the good as a sign of friendly feeling on the part of the nations concerned ; but the question of armaments was still outstanding. The Washington Conference had reached no agreement about the smaller warships, like cruisers and submarines.

Another naval conference was held in London in January, 1930, as a result of which a *Three-Power Pact* was signed between Britain, the United States, and Japan. France, however, refused to abandon the use of submarines, and was unable at the time to reach any naval agreement with Italy.

§ 4

Each of these treaties and conferences has, let us hope, helped to make peace more secure. The League of Nations, too, continues to work for peace and to watch over the health and well-being of Europe and the World.

But much work of education of public opinion has still to be done before we can be certain that Western civilisation will not perish in a world-war more ghastly and more destructive than that of 1914-1918. Covenants and treaties are not enough. We need to create a public opinion against war, *in all the nations*, and especially among the young people. If the world is to be saved, *patriotism* must not mean—as too often in the past—a pride in the selfishness of one's country and in her deeds of war, but a pride in her uprightness, her fair dealing, and her goodwill and service to humanity as a whole.

History is the only story that never comes to an end. In this series of Histories, we have glanced at the fortunes of mankind all the way from the first beginnings of civilisation, through the brilliant age of Greece and Rome ; through the darker ages when the Christian Church defended the remnants of culture against invading " barbarians " ; through the Renaissance, when the learning of the ancient world was rediscovered, and the nation states of modern Europe began to replace the old feudal system ; through the industrial revolution and the age of colonisation, when science began at last to give man power over nature, and white men went out from Europe to trade with and inhabit and govern the New World, India, Australasia, and Africa.

The great adventure is still going on. History is still being made. New chapters are still being added to this great story of the world, and in some ways the events which are nearest to our own time are the most interesting of all.

IN CONCLUSION

One great advantage of reading history is that it helps us to take an intelligent interest in things going on around us at the present day. In a few years you will be able to influence national and world history by the use of your vote. You will read more books in due course and you should *think for yourself* about such present-day questions as these:

How can Britain reduce unemployment?

Are the political experiments being carried out in Russia, and Italy, and Germany successful or otherwise?

How can another World War be prevented—by the League of Nations, or Treaties, or disarmament, or how?

How does India differ from other Dominions of the British Commonwealth of Nations?

Is industrial England moving south?

EXERCISES

CHAPTER I

1. Make a Time-Chart of your own, but do not over-fill it. Try to select *one* fact from each section or chapter; put it on the Chart and use it as a key to open the door of memory to the other facts which remain in your mind as a result of studying the chapters.

You will find these two watchwords *Memorise* and *Revise* very useful in studying history, and your Time-Chart should help you to do this quickly and well, if you compile it thoughtfully and use it sensibly.

2. On a blank map of England and Wales mark the places and districts mentioned in this chapter. Mark also the industry carried on there, e.g., fish exported, woollen cloth, iron smelted. Keep this map for future use.

3. Which were the chief ports of England at the beginning of the eighteenth century and how did they appear to Defoe?

4. Write a few lines about each of the following aspects of life in the early eighteenth century: how news travelled, coffee-houses, highwaymen, smugglers.

5. When did George I become king? Describe the appearance of the villages and roads of England at that time.

6. Look up your County History to see if you can find any description of your own neighbourhood about 1700-1725.

7. Describe the Yorkshire families Defoe saw at work.

CHAPTER II

1. Show how the old open-field system of agriculture was wasteful and unprogressive.

2. What does farming owe to Jethro Tull?

3. Who was " Turnip " Townshend, and how did he get this name? Would he have entirely agreed with Milton who had written about 100 years previously in his *L'Allegro* :

> " Straight mine eye hath caught new pleasures,
> Whilst the landscape round it measures ;
> Russet lawns and fallows gray,
> Where the nibbling flocks do stray."

4. An obituary notice of Mr. Robert Bakewell, who died in 1795, appeared in a newspaper of that year and began thus : " This justly celebrated, Because *really useful* member of society, died last Thursday." Continue this as if you were the newspaper reporter and justify the italics.

5. What is meant by " the enclosure system " ? Illustrate the benefits of this from the work of Coke of Holkham.

6. Try to find out when your local hedgerows were planted, that is when the fields in your district were "enclosed." Study old local maps and note names. Have any names or "commons" survived ?

7. Draw a simple diagram of an unenclosed village ; mark on it (*a*) the open fields and strips ; (*b*) the meadow ; (*c*) the Common Land ; (*d*) the village street.

8. Read Allsop's *Change to Modern England* (1931 edition, Nisbet and Co.) ; Prothero's *English Farming, Past and Present,* Goldsmith's *Vicar of Wakefield,* and extracts from *Deserted Village,* and Cowper's *The Task.*

9. The growing of turnips and other root crops as food for animals brought great benefit to the health of the nation. Can you explain why ? (Get from your library a copy of Gilbert White's *National History of Selborne* and read revelant letters (see index) before answering this question.

10. Turnips and root crops were first grown in Norfolk about the year 1700 ; in Cornwall and Devon about the year 1800. Why did the knowledge of improved farming spread so slowly ?

CHAPTER III

1. Make a three-column list showing (*a*) the names of the great inventors in cotton and woollen industries, (*b*) date of their invention, (*c*) what their invention was.

2. Explain the following terms: warp, weft, shuttle, reed, carded wool, rovings.

3. Prepare a lecturette, or write an essay on one of the great inventors mentioned above. Consult other books for information and illustration.

4. The English Government in 1736 forbade by law the manufacture of purely cotton goods. Why do you think they did this? Arkwright was chiefly instrumental in getting this law repealed. Why was this an important matter to him?

5. What comments can you make on the following record of the number of watermills in 1788 for the making of strong water-twist for the warp: Lancashire 41, Derbyshire 17, Yorkshire 11, Cheshire 8, Staffordshire 7, Westmoreland 5, Nottinghamshire 17, elsewhere in England 8?

6. Draw a map of the cotton industrial area of Lancashire on tracing paper and put this on the top of a contoured map of the same area. Write down your comments.

7. Read *The Romance of the Cotton Industry*, by Wood and Wilmore (O. U. P., 5*s*.); *The Golden Fleece*, by Morris and Wood (O. U. P., 3*s*. 6*d*.).

8. In what way were the great textile inventions of value to mankind? Try to obtain some information about the immense cheapening of cotton goods which they brought about.

9. Cartwright's Power Loom was invented about the year 1790, but power looms were not in use in large numbers till after the year 1820. Can you explain why the power loom was introduced so slowly into factories?

10. Do important inventions usually take a long time to come into general use? Try to find illustrations in your own experience.

CHAPTER IV

1. Write an essay on " Necessity is the Mother of Invention," or on " Great Things grow from Small Beginnings," or on " The Trials of Great Inventors," and illustrate it by examples from the stories you have read in this book or elsewhere.

2. Prepare a Life of James Watt and collect as many pictures as you can to illustrate it.

3. " At last the links between the coal, iron, steel and textile industries were completed." What does this mean and what is its importance?

4. " I sell, Sire, what all the world desires—power." Comment on this.

5. Enter these figures regarding iron-smelting in your note book:

Date.	Smelting Furnaces. Using Charcoal.	Smelting Furnaces. Using Coke.	Output.
1788	24	53	61,300 tons
1826	—	266	417,566 tons (in 1823).

(*a*) Write underneath your table any comments you can make on it.

(*b*) Accompany this with a map showing where charcoal and coke furnaces respectively were. Account for the change.

6. Read: Samuel Smiles, *Industrial Biography*, and his *Boulton and Watt*, both published by Murray.

7. Why can we speak of "The last teeming years of the 18th century?"

8. The spinning of cotton was done at first by hand, then by machinery, at first driven by water power and later driven by steam power. In what sorts of areas did each of these changes encourage the cotton industry to grow up?

CHAPTER V

1. Collect as many illustrations as you can showing early eighteenth-century modes of transport and travelling.

2. Find out all you can about your own roads and canals, e.g., the making of the "turnpike," toll bars, historic inns (posting houses), date of the canal, its builder's name, its course, goods carried on it.

3. Tell in your own words the story of James Brindley.

4. Write an essay on "Lighthouses." (Look up other information in your library books.)

5. Prepare a lecture with some such title as "The Romance of the Road," and trace the story of travelling in England through the ages.

6. Show how good means of communication and thriving industry are mutually dependent upon each other.

7. What "history" can you see beneath the surface of the following words and phrases? *To be kept on tenter hooks, manufactured goods, navvies, macadamised roads,*

8. Read: De Quincey's "Old Time Travelling in England," in his *English Mail Coach* (Blackie's English Texts, 10*d.*); C. G. Harper's *Stage Coach and Mail in Days of Yore* (Chapman and Hall); S. and B. Webb's *The King's Highway* (Longmans); Samuel Smiles's *Lives of Brindley and Telford* (Murray).

9. Make a tracing on a contour map showing: (*a*) the Liverpool and Leeds Canal; (*b*) the High Peak Canal.

10. Describe the purpose of a canal lock and explain why canal building was more difficult and expensive in England than in Holland.

CHAPTER VI

1. Tell briefly what you can remember from your earlier study of history of each of the following: (*a*) Clive, (*b*) Wolfe, (*c*) Washington, (*d*) Cook, (*e*) The Pitts, (*f*) Nelson, (*g*) Wellington.

2. Who was "The Great Commoner"? What did he do for England? What saddened his closing days?

3. Draw maps to show the gradual extension of British power in India.

4. What effect had the Napoleonic Wars on British credit and trade conditions? Can you mention any parallels of these conditions after the Great War of 1914-18?

5. Give the chief stages in the history of the U.S.A.

6. Would it be true to say "Trade follows the Flag," or "The Flag follows Trade."

7. Between 1760 and 1813, wages rose by 10 per cent., but the price of wheat rose by 130 per cent. (*a*) Account for this; (*b*) What effects can you suggest would result from this? (*c*) What happened after 1815?

8. Sometimes, during the French wars, the price of wheat and other foods in England rose to famine prices. Why did this take place?

9. "A child of the Revolution," "the greatest adventurer of modern times," "the champion of liberty," "the most far-teaching tyrant," "emperor." All these have been applied to one man—Napoleon. Which of these descriptions do you think fair, and why?

10. What were the effects of the wars with France on (*a*) English trade and manufacturing; (*b*) the British Government's attitude towards the British working people?

CHAPTER VII

1. Write a short account of one of these: "The Night-watchman, old and new"; Transportation; Prison Reform.

2. What were the Combination Laws, and why were they enacted? How did they affect employers and workmen respectively?

3. Tell how the Combination Laws were repealed, and what resulted from their being repealed.

4. Write short notes on Joseph Hume; Radicals; Free Trade.

5. Do you think that Francis Place deserves the title of "Patriot"?

6. What were the effects both good and bad of the great industrial changes which brought crowds of workpeople into the new towns.

7. The Combination Acts were repealed in 1825. Why was a further act passed in 1826 and what did it do?

CHAPTER VIII

1. Write a short composition on "Distribution" and illustrate its importance from your own neighbourhood or from your nearest manufacturing town.

2. Tell of the attempts to improve land transport before the days of George Stephenson.

3. Prepare a "Life of George Stephenson." Show his perseverance, courage, and modesty as well as his ability. Procure as many illustrations as you can.

4. On a blank map of England and Wales insert the chief towns in 1801, unconnected by railways. On another insert the chief railways to-day and place dots where there are large towns. Try to show the size of the towns by the size or shape of your dots, but you need not insert the names of the towns. (Keep these maps for future reference).

5. Find out all you can of the history of your local railway.

6. What changes had made such a great need for better transport that men were now willing to spend millions of pounds in building railways?

7. What effect did the new railways have on the work done by the roads and canals?

8. How did these new railways help greatly to increase Britain's foreign trade?

9. "English engineers and English money helped to build the railways in Germany, France and America." See if you can obtain information from other books about this statement. In what ways would this help English trade and manufacturing?

CHAPTER IX

1. Write a short account of the work of Galvani, Volta, and Oersted.

2. Tell the stories of the first electric battery, the first dynamo, and the first electric motor.

3. In your science lessons work some simple experiments or make some simple models to illustrate the discoveries mentioned in this chapter. Can you do any of these at home?

4. Prepare material for an account of Michael Faraday. Consult other books if you can.

5. Give a brief account of the assistance to be obtained in the home of to-day by the use of electricity.

6. What great improvements in communications were made in the 19th century as a result of the discoveries of these pioneers in scientific discovery?

CHAPTER X

1. Tell the story of the passing of the Reform Bill of 1832.

2. When will you have a vote? Show from this chapter that one single vote may be of vital importance.

3. In whose interests was the Reform Act of 1832 passed? Why were the poor so excited about it?

4. Find out if there was any excitement in your town at the time of the Reform Bill (e.g., the Bristol Riots, the burning of Nottingham Castle).

5. Find any pictures of old elections and study them. Tell if they show any evidence of bribery, etc.

6. When did Britain abolish slavery in her Empire? How was this brought about? What effect had it?

7. What was the Speenhamland system? Compare it with the " Unemployment Benefit " of to-day.

8. When did the " Boards of Guardians " come into being, and why? When did they cease to function and who took over their duties? (See last chapter of book.)

9. What important reforms were carried out by Parliament in the years 1822-1826, and what great English minister was responsible for them?

10. Write short notes on: Lord Shaftesbury, Lord Grey, Lord John Russell, Wilberforce, Gladstone.

11. Compare the conditions of life under which a factory-worker and his family lived in 1830, with those of 1930.

12. Show that 1832, 1833, 1834, 1835 are important Reform years.

CHAPTER XI

1. In which years, particularly, did England go " railway mad "? What harm resulted from this? Take a railway map of Great Britain and show by colours, or otherwise, how our railways are now grouped into four units. What good should this do?

2. Make a graph to show the growth of population in England since 1100, from the following approximate figures:

Years :	1100	1200	1300	1400	1500	1600	1700	1800	1900
Millions :	2¼	3	3½	2½	3	5	6	10	31½

Account for the drop between 1300 and 1400 and for the sudden rise between 1800 and 1900.

3. Indicate by shading or colouring on separate maps of England and Wales the distribution of population (*a*) about the middle of the eighteenth century, (*b*) about the middle of the nineteenth century, (*c*) at the last census.

4. Account for the changes which these maps show.

5. Write a composition on "The Man in the Railway Signal-Box," and remember that *fact* can be more interesting than *fiction*.

6. Write a few lines on each of the following ships: The *Charlotte Dundas*, the *Clermont*, the *Comet*, the *Sirius*, the *Great Western*, the *Caroline*. Secure illustrations of these if possible.

7. If the *Caroline* had completed her work exactly a hundred years earlier, what might this have effected, do you think?

CHAPTER XII

1. What is meant by "The Hungry Forties"?

2. Comment on these words of O'Connell in the House of Commons in 1842: "The people are hungry, let them eat. There are at this moment one and a half million quarters of wheat lying in bond, waiting until prices become high enough."

3. The population of Ireland in 1841 was 8 million; in 1851, 7 million. Can you account for this?

4. Give an account of the Corn Laws and their repeal.

5. Tell what you know of one of these: Cobden, Bright, Peel, Owen.

6. Who were the "Chartists"? Which of their aims have been accomplished? Then why did "Chartism die down and disappear"?

7. What is a Trade Union? Tell of the rise of this movement. What can you say for and against Trade Unions to-day?

8. How old must a child be to-day before he can "go to work"?

Compare the lot of a present-day child in this respect with one a hundred years ago and trace the gradual improvement through this period.

9. Between 1825 and 1835 many hand loom weavers were out of employment; others were receiving very low wages. Describe the change in industry which caused these things.

10. What great new constructive work finally found employment for many of these men?

11. In what ways did the great changes of the Industrial Revolution in the 18th and 19th century make it easier for men to combine together in Trade Unions?

CHAPTER XIII

1. "Post this letter, please." Look up the history of this word "post" in your dictionary and show how it comes to mean what it does to-day.

2. Write a composition of "Letter-carrying in England, past and present;" or "Co-operative Societies: their origin, development and utility."

3. Subjects for debate: "Should the Penny Post be restored?"

"Should Lock-outs and Strikes be made illegal?"

4. Give an account of the growth from small beginnings of one of your great local businesses under the title of "A Romance of Industry."

5. Write the life-story of the inventor whose career has most strongly appealed to your imagination.

6. What great industries have grown up, on or near the River Tyne? Why do you think they have grown up in that neighbourhood?

7. Write a short account of the Rochdale Pioneers.

8. What do you know of the work of Samuel Lister (Lord Masham), the Yorkshire silk king?

9. What is a co-operative society? How does it differ from an ordinary business?

CHAPTER XIV

1. What do you understand by Nationality; Democracy; Communism?

2. In which European countries were there risings in 1830? What were the results?
3. Why is 1848 called "The Year of Revolution"?
4. Describe the see-saw movement between monarchy and republic in France between 1780 and 1870. (See diagram).
5. Who was the "Man of Blood and Iron"? How did he get his name? Do you think it is an apt and sufficient description of him?
6. Prepare an account of Garibaldi. (Consult other books; prepare maps, etc.)
7. Discuss in class your opinions of Metternich, Bismarck, Mazzini.
8. Show the importance of Louis Blanc; Kossuth; Karl Marx.
9. Why are the following battles important: Magenta and Solferino; Sadowa; Sedan?
10. What do you know of the German Commercial League of 1852? How was it formed, why was it formed, to what very important change in Germany was it a big step forward?
11. How did (*a*) the results of the Franco-Prussian War, and (*b*) the work of English chemists each help in the development of Germany's great industries?
12. What good features in the character of the German people have played an important part in her rise as a leading nation in manufacturing and in trade.

CHAPTER XV

1. Prepare and write an account of Florence Nightingale.
2. Compare the "unrest" in India in 1931 with that in 1857.
3. Tell the story of the "awakening" of Japan *or* of China.
4. From what you have read in the newspapers and elsewhere, outline the problems which *to-day* face India, Japan and China.

5. Who was the outstanding figure of the American Civil War? What was the task he set himself to accomplish? Was he successful?

6. How did the American Civil War affect England?

7. Compare George Washington and Abraham Lincoln. (Read all you can about these two statesmen, in other books.)

8. Research and Essay: Origin, development and end of the East India Company.

9. From a history atlas, trace on a blank map of America, the area of the 13 states of America when it first became independent. Compare this with the present U.S.A.

10. Add to your map the new states and put in the date when each group was added. (Get from your public library the atlas of the Cambridge Modern History; it contains a good map for this purpose.)

11. Write out a week-end shopping list for your family. Say from where the various articles have probably come and explain why some of them (e.g. Canterbury lamb) could not have been bought by your grandfather.

12. Describe the work done by Lord Dalhousie in helping forward the trade of India.

CHAPTER XVI

1. Show that 1867 was an important year for the British artisan.

2. Can you give the reasons for the Irish discontent? Do you remember any incidents in earlier centuries which contributed to this?

3. Now tell how the English Parliament tried to remove these grievances.

4. "A leap in the dark"; "dishing the Whigs." To what do these expressions refer? Explain them.

5. What did (*a*) a tenant farmer in England rent from his landlord and what had he to provide for himself; (*b*) a tenant farmer in Ireland rent and what had he to provide himself?

6. What part did England take in checking the suffering in Ireland during the famine in 1845.

7. What very important influence did that famine have on affairs in England (look back to Chap. XII).

8. After the Reform Acts of 1832 and 1867 what large groups of persons were still not entitled to vote?

CHAPTER XVII

1. Make a three-column table to show the gradual extension of the *Franchise* as far as you have studied. Keep this table and add to it later. Head your columns (1) Date; (2) Chief people; (3) Changes brought about.

2. Make a similar table for *Education*, and another for *Better Conditions for the Artisan* (Trade Unions and Factory Acts).

3. When did the State make itself responsible for the education of its children? What brought this about? What provisions for education had there been previously?

4. Two of the things for which Gladstone is remembered are finance and education. Illustrate this.

5. What do you think about the "Alabama" incident?

6. Make a graph to show the following Deposits in the Post Office Savings Bank: 1881, 80 million pounds; 1891, 114 millions; 1901, 192 millions; 1907, 209 millions; Can you find any figures for later years?

7. "Disraeli's Reform Act had created a Democracy." Explain as simply as you can what you think a Democracy is.

8. Write a brief summary of the reforms of the Gladstone Government to 1874 and say why each of the changes was considered necessary.

CHAPTER XVIII

1. Say briefly how each of the following has been a great benefactor to mankind: Sir Humphry Davy, Faraday, Simpson, Pasteur, Jenner, Lister.

2. Tell in fuller detail the work of one of the above men in whose story you have been particularly interested.

3. Prepare a lecturette on "The Romance of Radium." (Consult as many books as you can.)

4. Debate: Is life happier to-day than it was a hundred years ago?

5. Some great discoveries are said to have been made "accidentally." Do you know of any? Is "accidentally" *quite* true?

6. Give a brief account of the work of Lord Lister, the famous surgeon. Explain his great belief in the value of sunlight and cleanliness. (Look up in your dictionary the meaning of the word "antiseptic.")

7. Say what you know of: vaccination, inoculation, anthrax, carbolic, hydrophobia.

8. A surgical operation a hundred years ago was a thing of intense pain, terror and danger to the patient. To-day such an operation may be painless and comparatively safe. What two great discoveries have led to this, and who was responsible for each discovery?

CHAPTER XIX

1. Add from this chapter some more details to your table about "Better Conditions for the Artisan."

2. Draw a vertical Time Line and put on one side the chief bills passed by Disraeli and on the other those passed by Gladstone.

3. Write a short composition on "Disraeli's Imperialism."

4. Compare Disraeli and Gladstone as men and as statesmen.

5. What is the "load-line"? Show how it is important and how it came into existence.

6. Write short notes on: Town Council; Sanitary Code; Peaceful Picketting; Durbar; Coffin Ships.

7. Describe the attempts made to improve town life during this period.

8. What financial transaction of lasting benefit to the Empire was brought off by Disraeli? How did he raise the necessary money?

9. Why has Britain been so anxious for the last fifty years to have a voice in the affairs of Egypt?

10. Write a brief account of the events which led to this interest in Egypt.

CHAPTER XX

1. On a blank map of the world trace the routes mentioned in the last paragraph but one of this chapter. On this map, or on another if you prefer it, trace the routes as they would have been without the Suez and Panama Canals.

2. Work in small groups of four to prepare a short lecture on the Suez Canal; other groups prepare on the Panama Canal. Consult other books, procure illustrations (see Shipping Tours, etc.). The best joint efforts to be read to the class by the group leader.

3. You have had many instances of great courage in other spheres than war. Name several of them.

4. Show how, in the nineteenth and twentieth centuries, the world has become much "smaller" than ever before.

5. Why is the Suez Canal important to Britain? And the Panama Canal to U.S.A.?

6. Essay: De Lesseps, a great engineer.

7. "A doctor made the Panama Canal." In what way is this true? Who was the man? Give an account of his work.

8. How do builders of canals overcome the difficulties of uneven ground, and drive their canals through country with rising or falling land?

CHAPTER XXI

1. Why are the following dates important in the history of Canada: 1759, 1840, 1867, 1885?

2. Tell the story of the welding of the British States in North America into the Dominion of Canada.

3. Give an account of the construction of the C.P.R. Show why it is so important to Canada. With what other undertakings can you compare it? Make a sketch map.

4. Describe the formation of the Commonwealth of Australia and show what difficulties she has had to overcome.

5. Write a short account of British rule in India since the Mutiny.

6. What is meant by "the scramble for Africa"? Illustrate by a map.

7. Tell what you know of the history of the Boers.

8. "Cecil Rhodes, Empire-builder." Make this the subject of a short composition. Illustrate by a map.

9. The following are important dates in the history of South Africa: 1652, 1795, 1836, 1879, 1884, 1899-1902, 1910. Why? Find out.

10. What is the British Commonwealth of Nations? How do rapid means of trade and communication help to unite that Commonwealth?

CHAPTER XXII

1. Add to your tables for Franchise Extension, Education and Better Conditions for the Artisan, the appropriate extensions mentioned in this chapter. (Those relating to the agricultural labourer's conditions may be added to the Artisan's.)

2. Your school is under either a Town (or City) Council, or a County Council. When did Town Councils and County Councils respectively begin? What is their work? Who is your "Member"?

3. When did the British Parliament become truly representative of its citizens? Explain fully.

4. Tell the story of Education in England or in Scotland.

5. Show how Parliament has cared for the old as well as the young.

6. What are the most important duties of a County Council? What people were responsible for Home Government in the counties before these councils were created?

7. A County Council contains (*a*) aldermen; (*b*) councillors. How are these people appointed? (Find out from your dictionary the meaning of the word "alderman.")

N.B.—There are also aldermen and councillors on a City or Town Council. In Scotland the mayor is known as the "provost" and the aldermen as "bailies." If you have read *Rob Roy* you will remember Bailie Nicol Jarvie.

CHAPTER XXIII

1. What do you know of "the Jew at the Red shield?"

2. What part does (*a*) the banker and (*b*) financier play in the development of industry?

3. How does a banker make money for himself? Illustrate this from the story of the Rothschilds.

4. Tell of the rise of any great shipping company. (Perhaps you have a *local* firm.)

5. What is a Stock Exchange? Describe the business of a stockbroker.

6. The late Lord Melchett "rationalised" the Chemical Industry. What did he actually do, and for what reasons?

7. Some Socialists wish to "nationalise" the mines, the banks, and other great industries. What is it that they wish to do?

8. What is a "Limited Company?" Why have such companies increased in numbers very rapidly since they were made legal in 1855?

9. What is a "Combine"? Name any Combines you know.

CHAPTER XXIV

1. Write a short composition on the development of the means of transport under the heading, "From Stage-coach to Aeroplane."

2. "How it works." Under this title write about one of these: wireless, the cinematograph, the electric light, the telephone, the petrol engine (motor car).

3. Show how any two of the above (Question 2) have altered our social life.

4. Debate: Which of the modern inventions has affected village life the most?

5. What changes in appearance of your town would appear most striking to a "Rip Van Winkle" who had been asleep for fifty years?

6. Write an essay on "The Advantages and Disadvantages of Aeroplanes for Passenger Traffic."

7. Write paragraphs showing the value of wireless telephony, as represented by "broadcasting" to (*a*) the police; (*b*) the seaman; (*c*) the blind; (*d*) the villager.

8. Show by brief descriptive paragraphs that you know the chief features of (*a*) a monoplane; (*b*) a seaplane; (*c*) a biplane; (*d*) a dirigible.

CHAPTER XXV

1. What difference do you think the use of electric power and water power in other parts of the world is making to British industries?

2. What effect do you think the use of water power and electricity will have on the life and work of the people of Norway or Switzerland? (Think of the great changes of the Industrial Revolution in England.)

3. The use of coal "localised" our industries. What does this mean?

4. The use of electricity is distributing them more widely. What does this mean and why should it happen?

5. In the 19th century the strong trade unions were *craft* unions, such as the Engineers' or the Joiners'; in this century the most important trade unions are *industrial* unions, such as the Transport Workers' Union, or the National Union of Railwaymen. What is the difference between a *craft* union and an *industrial* union? Why has this change taken place?

6. What countries in Europe have returned to "a system of Dictatorship?" What is the difference between a Prime Minister and a Dictator?

7. Describe the General Strike of 1926 and its results.

8. What is "rationalisation"? Give an example of a great industry that has been "rationalised." Who was responsible?

9. Mention the main events in the history of Trade Unionism since 1900.

10. Tell the story of Lever Brothers.

11. Write an account of the latest long-distance flight by air of which you have read.

12. What was (*a*) a Poor Law Union; (*b*) a Board of Guardians? What is a Public Assistance Committee? How is it appointed?

Chapter XXVI

1. What happens to a man who cannot find work in modern Britain?

2. What are the causes of unemployment?

3. In what great industries in Britain has there been very serious unemployment since the Great War of 1914-1918?

4. How do Japan and India affect the cotton trade of Lancashire?

5. What is "Safeguarding"? Give some examples of safeguarding duties.

6. In what ways have (*a*) the revolution in Russia, (*b*) the discontent in India, (*c*) the revolutions and civil wars in China affected British trade and helped to make unemployment here? Can you say what great trades have suffered most from each of these causes?

7. For ten years the export of coal from England and Wales has been decreasing steadily and the British coal industry has had very heavy losses, while many colliers have been without employment. Describe some of the reasons for this serious change.

8. "When prices are falling, the adventurous trading spirit is checked." Can you explain what this means?

9. Write short notes on Free Trade; Protection; Dumping; Safeguarding.

10. Why do you think the merchant is often a Free Trader and the manufacturer in favour of Protection?

CHAPTER XXVII

1. What is a "written constitution"?

2. What great English speaking nation has a written constitution and when was it framed?

3. During the 19th century we used to speak of the British Empire—now we must speak of the British Commonwealth of Nations. What great changes have gradually taken place to make this necessary?

4. India is pressing to be given a much larger measure of self-government and of freedom from the British Parliament. What very important events have taken place (*a*) In 1919; (*b*) in 1929-30; (*c*) in 1930-32, in connection with these claims for self-government?

5. In India there are (*a*) British States and (*b*) Native States under British influence. What is the difference between these two groups?

6. The Simon Commission has recommended that the Government of India shall be a *Federal* Government. Can you explain quite simply what you think this means?

7. Do you think that India will ever become one of the self-governing Dominions? Give reasons.

8. Write a letter to your member of Parliament, telling him what you think ought to be the policy of the British Government towards India; make use of your knowledge of history and of the Simon Report (1930).

CHAPTER XXVIII

1. "The 19th century had seen the growth of a greedy nationalism." What does this mean?

2. What new states came into being as a result of the war and the Treaty of Versailles?

3. Look back in your history and find out how and when Poland lost her ancient independence. Write a short account of the history of Poland.

4. Look up, on your map of Europe, the town of Danzic. Notice the strip of non-German territory which leads to this town. Examine your map carefully and explain why the German nation strongly dislikes this "Danzic corridor."

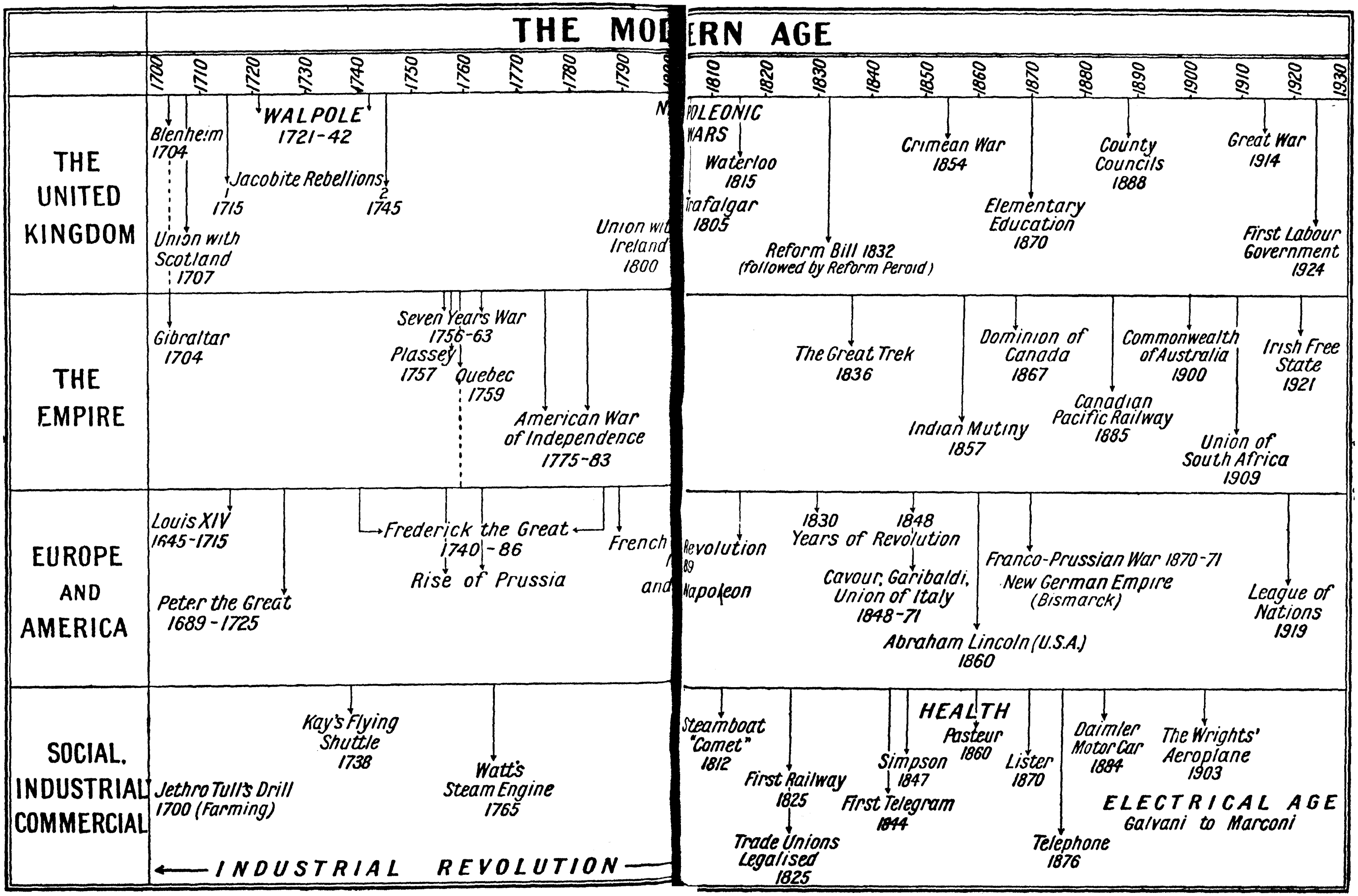
5. What are the main countries of "Latin Europe," and why are they sometimes called the Latin Countries?

6. Draw a sketch-map of post-war Europe, showing the boundaries of the new states.

7. What was President Wilson's principle of "self-determination" and how and to what extent was it put into practice by the Treaty of Versailles?

8. Give a short account of the Treaties and Conferences by which the nations have since the Great War sought to make Peace more secure. Have they succeeded entirely?

9. In what ways do you think Britain has become (*a*) more (*b*) less democratic since the Great War?


THE MODERN AGE
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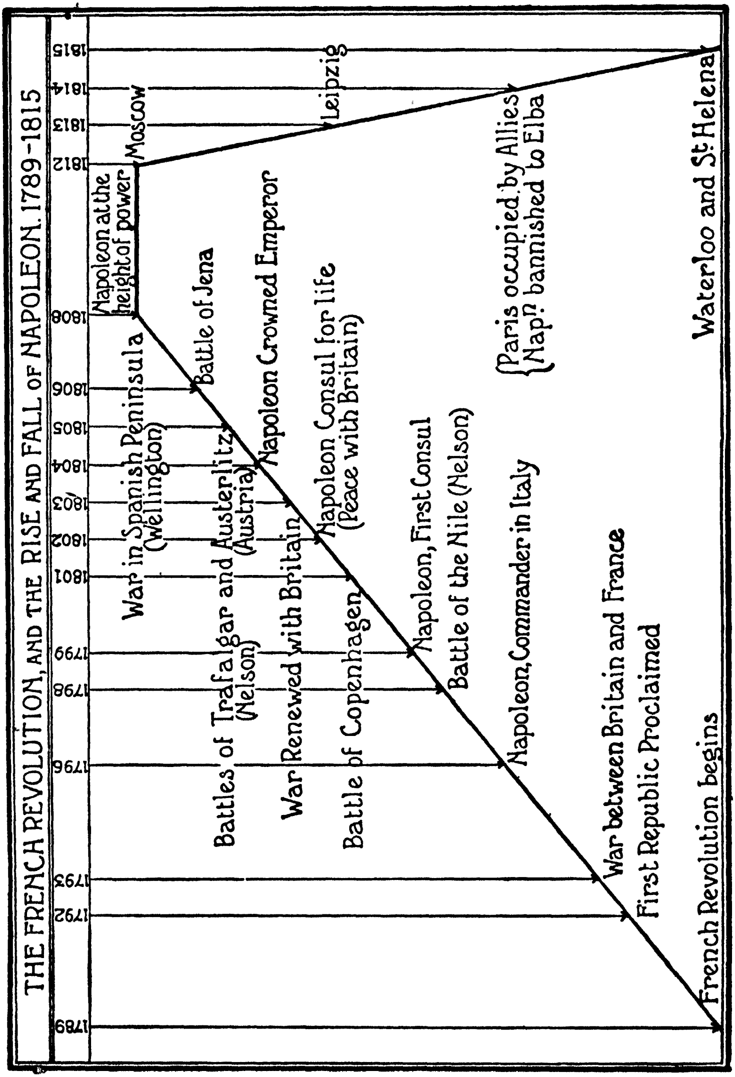
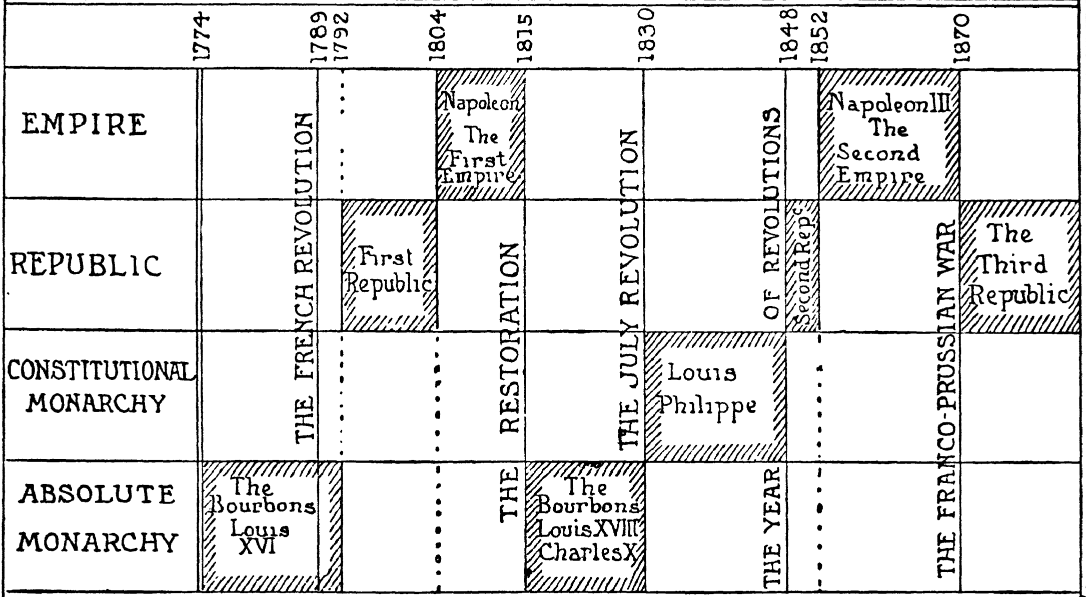
1850
1860
1870
1880
1890
1900
1910
1920
1930
THE UNITED KINGDOM
Blenheim 1704
WALPOLE 1721-42
Jacobite Rebellions
1 1715
2 1745
Union with Scotland 1707
Union wi Ireland 1800
N POLEONIC WARS
Waterloo 1815
Trafalgar 1805
Reform Bill 1832 (followed by Reform Peroid)
Crimean War 1854
Elementary Education 1870
County Councils 1888
Great War 1914
First Labour Government 1924
THE EMPIRE
Gibraltar 1704
Seven Years War 1756-63
Plassey 1757
Quebec 1759
American War of Independence 1775-83
The Great Trek 1836
Indian Mutiny 1857
Dominion of Canada 1867
Canadian Pacific Railway 1885
Commonwealth of Australia 1900
Union of South Africa 1909
Irish Free State 1921
EUROPE AND AMERICA
Louis XIV 1645-1715
Peter the Great 1689-1725
Frederick the Great 1740-86
Rise of Prussia
French and
Revolution 89
Napoleon
1830 1848 Years of Revolution
Cavour, Garibaldi, Union of Italy 1848-71
Abraham Lincoln (U.S.A.) 1860
Franco-Prussian War 1870-71
New German Empire (Bismarck)
League of Nations 1919
SOCIAL, INDUSTRIAL COMMERCIAL
Jethro Tull's Drill 1700 (Farming)
Kay's Flying Shuttle 1738
Watt's Steam Engine 1765
INDUSTRIAL REVOLUTION
Steamboat "Comet" 1812
First Railway 1825
Trade Unions Legalised 1825
HEALTH
Simpson 1847
Pasteur 1860
Lister 1870
First Telegram 1844
Telephone 1876
Daimler Motor Car 1884
The Wrights' Aeroplane 1903
ELECTRICAL AGE Galvani to Marconi



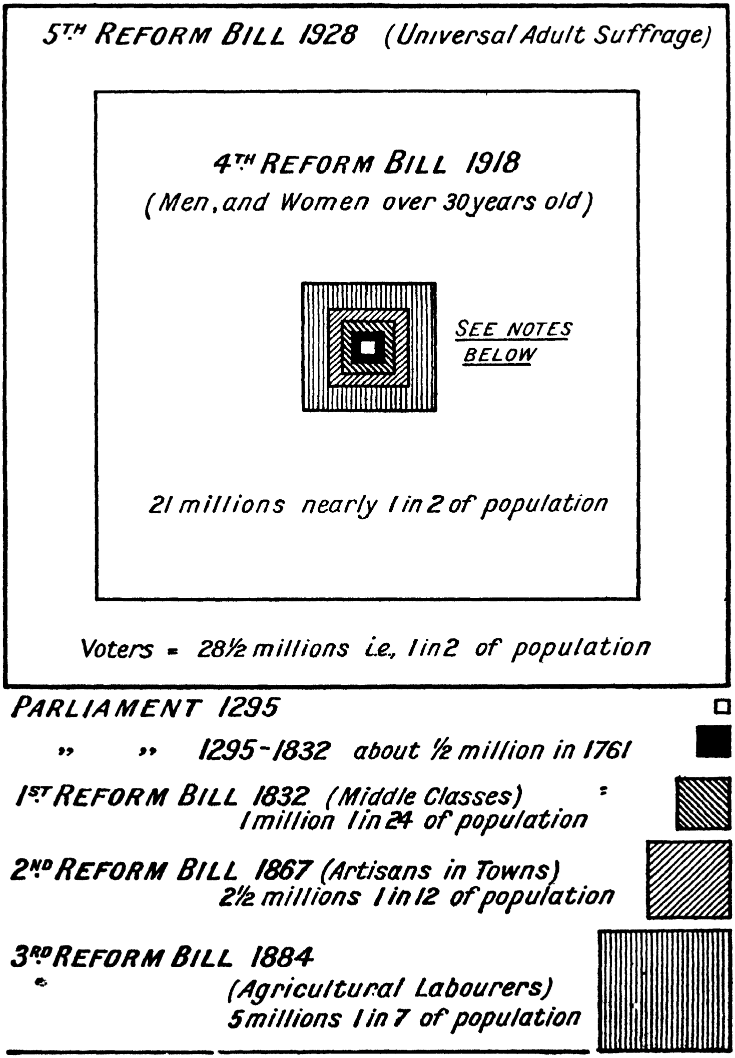
THE FRENCH REVOLUTION, AND THE RISE AND FALL OF NAPOLEON. 1789-1815

FRANCE: THE LAND OF REVOLUTIONS



The See-Saw of Government in France

THE DEVELOPMENT OF PARLIAMENT AND EXTENSION OF THE VOTE



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